

# **HOW DOES SOCIAL DISTANCE INFLUENCE BEHAVIOR AT THE INDIVIDUAL LEVEL AND THE GROUP LEVEL? A STORY THROUGH EXPERIMENTAL ECONOMICS**

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## **Preface:**

The question of which personal factor(s) interfere with people's behavior in real life that results in the outcomes differing greatly from predicted theories has been partly answered by social science. Yet people are analyzing decisions and the decision making process to go deeper than the surface, human beings are more complicated than self-interested creatures. Game-theorists have found a number of experimental evidence that does not end up in the equilibria and built up different theories to reason their observations. Prisoners in the Prisoners' Dilemma do not always defect (Dal Bo P 2005); Dictators do not take all the money in a Dictator's Game (Charness and Gneezy 2008) – this fact started to give researchers the benefit of the doubt.

The purpose of this book is to propose factors tested by theory and experimental evidence to introduce the readers to what potentially change their behavior and observe its implication on others' behavior. It also cites a number of definitions and ideas of other researchers so as to provide the audience with a different scientific point of view in the most comprehensible way. There are real life examples in addition to theories to connect dots and help the audience to associate themselves when they read through, thus makes it more approachable to less technical readers. The logic goes as follows: through observation of different individuals and cultures, a series of thoughts are discussed with colleagues and other scientists, a small group of factors are believed to cause shocks in behavior and have an impact on the decision making process. When conjectures are formed, experimental methods are designed to accommodate the theory and test the expected variables (now that the invisible factors have been formalized in certain conditions known as treatments). The book covers from an individual concept like "social distance" (the degree of reciprocity that subjects believe exist within a social interaction – Hoffman et al. 1999) to a broader one like the problem of corruption with evidence and comparison of diverse samples. Some may argue that the design of the first experiment somehow interferes with the impact of reputation rather than social distance. Due to L Cabral (2005), names carry the signature of our past behavior, thus are connected to reputation. However, reputation is built through updating a Bayesian belief. Within the scope of a one-shot game, the use of full name may very well reasoned to be associated with social distance because there are no more than one period. Thus, subjects can not build their reputation and benefit from it in an economic sense. Readers can enjoy a gentle walk through the hypothesis with detailed information of the design,

the setup, data analysis and discussion of three main factors that is believe to interfere with behavior: social distance, corruption as a maximization problem and grouping effect. The book is structured as follows: the first chapter discusses the general framework and the reasons for which the hypotheses are formed and tested. The second chapter introduces how social distance affects behavior in a public good game and if culture plays an important role. The third chapter debates corruption when people's social distance varies. The fourth chapter finds impacts of social distance on a group of people, known as grouping effect when people belong to different natural or social groups. They are linked together to serve as a big picture of how social distance interacts with other situations and results in different outcomes. However, these chapters can be read individually without any loss of generality. Chapter five includes the overall discussion of the findings and how to apply them into real life for better social outcomes.



## Chapter 1: Introduction

Plato, when discussing his Republic, used an example of the ring of Gyges to debate how righteous people can remain when their behavior is unobservable by others. Gyges was a shepherd serving the king of Lydia. During an earthquake, he was led to a secret pathway where he found a magical ring that turned anyone wearing it invisible. Being unseen, Gyges started to lie, kill, overthrow the king and took his kingdom. Invisibility does not only make it possible for anyone to commit the crime or compromise moral standards, it also binds no consequences upon them, which invites ill-thinking and wrong-doing.

This research uses an experimental method to introduce, test and discuss the boundary and momentum of behavior under different levels of anonymity. When someone is socially anonymous, they are also tempted to be less responsible for their own behavior and action as opposed to other cases when they are identified. It is defined as *social distance* by which we associate ourselves to others and it is believed to have a strong impact on how we behave. A specific case when collective information is exposed and an opportunity to maximize pay-offs is set up as a sequential game. The idea of taking personally at other people's cost is mimicked as a corruption game where information of collective social distance and punishment are introduced. Finally, how does this information change the way people categorize themselves and others, based on which their behavior differ, too. All these are going to be introduced, tested and discussed in the following chapters in which *social distance* plays the role of connecting dots in different social concepts and situations.

The first chapter introduces the concept of social distance (*"the degree of reciprocity that subjects believe exist within a social interaction"* – Hoffman et al. 1999) and its direct impact on behavior when someone interacts with another in a situation where their payoff is involved. A number of researchers (Andreoni 1988, 2004, Gaechter 2000, Croson 2006) are interested in studying the mechanism under which people contribute more to the public good. Although public goods have well been research, the approach to public behavior as a type of public good, especially together with the impact of social distance, is totally new. This research debates public behavior as a type of public good due to its non-excludability and jointness in consumption.

When social distance changes, how does this have an impact on public good contribution of people from different cultures? This is the main question to be addressed through the experiment. A research from Ipsos Mori 2012 witnesses a polarization between Germany and China in the social attitude towards acceptable behavior. For instance, 84% of the surveyed subjects strongly support the government to ban smoking whereas only 49% of German share the same opinion. It turns out that wealthier nations are more liberal and they trust individuals more in adjusting their behavior to the environment around them. Countries like China or Palestine rely on more strict regulations to maintain public behavior. Smoking in a public place is up to the people's discretion if it annoys another one.

Do different cultures vary that much in public behavior or is there (more than one) a variable that polarizes their opinion? One of the cores of German culture is individualism (Thomas 2003) that can be compared to the face-saving feature of the Chinese culture in the same research through their behavior in the public good game under different levels of social distance. In other words, individualism in German culture stands so strong that a person is identified with their own values. This is similar to the Chinese “face saving” feature in their culture, yet it is a lot different at the same time. Because of this German individualism, people do not hesitate to stand out from the rest to defend themselves. It works in the same direction with the Chinese culture if it is a positive case of good behavior or generally accepted ones. But in case of a contradiction between personal payoff and discretion, German and Chinese people behave in a different manner. For example, a German child may not fear to speak a foreign language whereas a Chinese child of the same age may be less likely to do so in fear of making mistakes. In this case, what is called social distance (see chapter 2 for detailed definition) interacts with shyness and causes different people (especially from different cultures) to change their behavior when they face the same situation. Hoffman et al. (1999) find evidences that mean offers in a dictator's game are inversely correlated with social distance. The more people feel their individuality is exposed, the more fair they behave. There seems to be a gap between the influence of social distance over behavior in relation with culture. This study uses the same variable in identifying the determinants in a public good game.

Another aspect is expectation, which is proxied by the guess of individuals when they are in a public good situation. Croson (2006) confirms a positive correlation between individual

contribution to the public good and their belief in their partner's simultaneous contribution. Under a high level of social distance, it is expected that people contribute less and believe others are also doing the same thing. The result turns out that polarized cultures like German and Chinese differ in mean contributions under a high level of social distance. German subjects invest more in the public good as opposed to the Chinese ones, which addresses the question why German behavior is more socially constructive in public behaviors (i.e. queuing, more discrete conversations in a public place). However, good news is that both samples converge to the same level of contribution under a low level of social distance. This means that making people show their face or name can encourage people to invest more in the public behavior. Note that people may not necessarily remember another one's name or face with only one time introduction, thus it is illogical to reason that bad experience gives someone a bad name for a long time (at least for strangers). It is the notion that others can observe someone that makes they behave differently. To an extent, if someone is believed to fit a stereotype and they know that they are being watched, their behavior may even exaggerate the stereotype more than their normal behavior.

Not only do people contribute more, they also believe that others are giving more. People contribute more when they believe others are giving more as well (Shang and Croson 2009). It can be hard to reason with economic theory as someone will end up with more pay-off when they wait for the other to contribute and make use of their benevolence. Even in one-shot games (meaning that people will not be matched to play against each other again), people still tend to be more cooperative when there are signals that their partner is sensible. This behavior is called assurance, it is not completely trust but it assures the outcome of the public good to be positive, hence lubricates social productivity and reduces costs. Yamagishi and Yamagishi (1994) argues that assurance is the reason why the trust level of Japanese people is significantly lower than that of American people in a trust game, when he realizes how much it takes for a Japanese person to fully trust another, where social assurance is on the surface and yet it is the correct term between strangers or newly-met acquaintances. The question that triggers my interest is how social distance plays a role in answering cultural differences in behavior, for example: contribution, assurance, behaving for the greater good. This research serves as a part of the big picture concerning public good contribution (Andreoni 1988, 2004, Gaechter 2000, Brosig-Koch 2003,

Croson 2006) and the impact of social distance on behavior (Hoffman 1999, Gneezy, Charness 2008, Bohnet 1999, 2008, Frey 1999).

Social distance decides how much individual's identity is revealed. A person's identity is sensitive as it can be something people want others to know, to identify them as and to be remembered by. But it can be personal and in many cases, expects to be anonymous and neutral. Culture plays an important in the level of anonymity that a person is comfortable with. For example, people growing up in cultures where children do not have their own room or people have little personal space require a lower level of information privacy as compared to the ones who have their own room from childhood. At the same time, public good has remained the interest of many scientists because of many social construction depends on the public good mechanism. It benefits the majority of the society but it requires great efforts to be produced and maintained. Public goods do not refer to the "goods" dedicated to the majority of the society as intuition may suggest. In fact, non-excludability is the most characteristic identity of a public good, once it is produced, it cannot exclude one single person. Given this definition, national defense, natural environment including (un)pleasant noise, sound, smell... satisfy the conditions to constitute public goods.

Chapter two of this book approaches another type of public good: public behavior. We create the environment around us and benefit from it through quality time. But people behave differently in public, some people free-ride the tolerance of others and take advantage of any condition whereas some others try to keep things in order and fairness. When the number of people with bad (or good) behavior is large enough, it forms the culture of a certain group of people and makes the people abide accordingly. This results in bad cases when good people have to adapt to bad situations and do the same thing, although they know they should not and do not want to do so. Standing in line, for example, is a normal social activity in the West, especially in Germany. People line up for the bus, the train, the movies, the hospital and any social service without complaining or cutting the line. It applies on and works for everyone in that case and nothing is further discussed as social efficiency is reached. However, in some other countries, it is impossible to get people in line peacefully. Put it in mathematical terms, if there are  $k$  people standing in a line and person  $j$  starts to jump the line to the position of person  $i$ , this encourages

person  $i$  to cut the line as well. Observing this, person  $j-1$ ,  $j-2$ ,  $i-1$ ,  $i-2$  would also do the same and the domino effect will turn a line of  $k$  people into a circle where no one is lining.

As people's behavior is a heuristic procedure, it has a snowball effect in changing others. When public behavior is approached as a public good, we can come up with models to estimate the efficiency of the good and evaluate the necessary conditions under which the public good can be well maintained, yielding social payoff for the majority of the people who consume it. To ensure that a public good or a mechanism works, there are prices to pay or punishment even though it is impossible to exclude an individual from benefiting that special good. In the case of public good, it is important that people state it clear that it is a social norm and constantly sanction those who do not abide. This can be considered the maintenance cost – which is “paid” through the behavior of everyone in a given community that consumes this good. Strangers who want to fit in have to follow the spoken or unspoken regulations, it may not be the law but its tools may even be more efficient and flexible than the law.

Chapter two discusses this in more details with suitable literature review and an experiment to test whether people from different cultures (for this research I work with German and Chinese subjects) behave differently under three levels of social distance. By analyzing the data, it can be concluded if they differ and under which condition(s). The application of chapter one therefore, becomes useful in case of improving public behavior by lowering social distance regardless of the culture it is connected to.

The third chapter aims to unveil the mechanism by which corruption is vulnerable through an experiment. It was designed to test which tool is more efficient in reducing corruption in a developing country, where the corruption rate tends to be significantly correlated with public sector governance indicators. This erodes the social capital in an exponential loss because of its inefficient allocation of resources. The distortion of income caused by corruption invites potential social upheavals and unsustainable development of the human capital.

Corruption is inversely correlated with GDP growth, although it is not as simple as a one-to-one relationship but rather has noises from time-lag and the interaction of other variables as well. High corruption rates create barriers to resources, thus makes small business suffer and lose their competitiveness over the big corporates, who know the game and can afford it. In a large scale, it

diminishes the productivity, creativity and innovation of an economy. It can also lead to monopoly and crowd out the private sector, which is closely linked to high unemployment rate. One detrimental impact of corruption is its “domino effect” in education. People who suffer from corruption are more likely to engage to corruption than those who do not, despite their awareness of the trouble it causes.

Corruption comes in many different forms: bribery, theft of public assets, patronage (favoritism) to name a few. Whichever form it may take, the nature of corruption can be argued as a solution to a maximization problem with constraints on the law and moral standards. The economic person is selfish, hence it is reasonable to assume that they will do anything to increase their personal payoff as long as the threat is negligible. In countries where corruption rate is high, the law system is not strict in identifying the people who corrupt. Most researchers argue that it hinders development and invites social turmoil (Mauro 1995, Klitgaard 1988, Shleifer and Vishny 1993). Gangadharan et al. (2009) compared four samples Australia, Singapore, Indonesia and India and conclude that initiating a corruption is high regardless of the country. This rejects the hypothesis that certain groups of people do not corrupt or are not willing to increase personal gain at the cost of others. In fact, the research finds no difference in the distribution of bribery (number of cases, the amount of money offered). However, the attitude towards corruption polarizes. In less corrupt countries, third-parties are more willing to sacrifice their own cost to punish the involved ones. Punishment has been proven to be an efficient tool against corruption (Abbink, Hennig-Schmidt 2006, Irlenbusch, Renner 2002). An additional unit in corruption sanctioning results in a significant decrease in corruption rate (Mookherjee and Png 1995). This has a magnifying effect because without this corruption detecting unit, the threat disappears and the maximization problem has no constraints. Some other researchers are interested in the possible difference in gender or culture (Li 2012), however, they do not seem to have an impact on corruption. Men and women are equally selfish when it comes to increasing personal payoff. Regardless of where someone comes from, it is understandable that they are inclined to have more than less even though it may reduce the payoff of others. It is the environment that we live in decides and governs our behavior accordingly. The purpose of the study is to connect the experimental approach of testing information impact on corruption, which has been done through macro-economic models by a number of scientists. This new approach is expected to find the roll of information in a small scale and compare that to the punishment effect in the same context.

Vietnam ranks in the bottom in the corruption chart (Transparency International 2012, 2013) due to the unilateral press and media and its lenient punishments regarding corruption. This experiment addresses the question: which tool matters in a developing country by using punishment and level of information given in the game. The result shows that punishment works better in fighting corruption. In a country where corruption is implicitly expected in many social contexts, punishment is believed to be the strongest tool to reduce individual corrupt behavior. Information about corruption is not well received and shows little impact on reducing corrupt cases. It can be reasoned by the limited information the people are given on a daily basis about corruption. When this information becomes available, they do not appreciate it or believe it either. Brunetti and Weder (2003) argue that public press is bad news for corruption. This is true in a macroeconomic model with data from many countries and the majority of which are Western ones where democracy and public press are allowed to debate corruption openly. However, in less developed countries where information and the mass media are monopolistically controlled, one or two examples do not gain trust of the people to expect them to behave differently.

To mimic a corrupt situation, a bribery relationship involving the mentioned three people is established. This research approaches corruption from a microeconomic point of view through an experimental sequential game in which three people are involved. Two of whom can cooperate with each other to gain more personal payoff at the cost of the third person, who has the choice of reporting this situation. This action results in an outcome that reduces the payoff of the third person themselves as a cost of standing up against corruption but the price the other two have to pay is a product of the punishment amount and another magnifying effect (i.e. 3 times the cost of the third person). Naturally it can be predicted that the introduction of the punishment scheme reduces the corrupt behavior of the two. However, the relationship between those two variables when they interact with the information factor is not yet tested. This is in line with Klitgaard's (1988) findings where he asserts that involving people in diagnosing corrupt systems is an effective anticorruption strategy. Revealing information of the statistics (how many cases corrupt in the previous stage) can have no impact, light or strong impact on the next decision of the people in corruption context.

Transparency of information in this case can help to reduce the rate of bribery in the next stage or it may backfire depending on the large number of cases. For example, if the number of corrupt

cases exceeds some threshold, the people (or players in the game) observe this information and consider it a norm of behavior. Once it is justified and is adopted by the majority, it does not have a moral constraint anymore. One drawback of the experiment is that, corruption yields more payoff for the first two people at the cost of the third one, but experimenters do not observe the moral standards and the ability of the three people. Another unobservable disturbance term is belief, whether people trust the system or not. If someone has little trust in the system as a whole and thinks that the officials are monopolists, they will be unlikely to report the bribery. People with lack of capabilities are more likely to engage in corrupt behavior as their comparative advantage is limited (Bertrand et al. 2007). The information treatment described in details in chapter 3 is based partly on findings of chapter 2 although the level of social distance remains relatively large. No specific name or face or other individual identity is revealed, however, the overall situation is reported publicly during the procedure and it is expected to influence decision-making processes.

When social distance is reduced to an individual level as findings in a number of researchers have stated, behavior changes to more fair and constructive outcomes. If it applies in the bribery experiment, it may reduce the corruption rate significantly. This, however, is hard to apply in actual scenarios because it is not realistic to identify every single case of misconduct and corrupt with their name or face. Hence an application of collective information is introduced as to reduce the social distance of a group of people (for instance: the officials) and analyze their behavior to measure the effect of social distance. This part of the book is to confirm the possible important influence of information in fighting against corruption. It may not have a direct and immediate effect and yet it can constitute good arguments in negotiating for freedom of speech in countries where it is limited. Non-governmental organizations and other political entities who protect and advocate free journalism, neutral information rely on such findings to demand for better policies from governments of less developed countries.

The fourth chapter is a continuation of the social distance at a group level. When individual information is revealed, they behave differently (more constructively as stated in chapter two). This action has another meaning in shaping people's awareness: to which group they belong to. Because social distance, in other words, means how much a person is socially away from others. It is not a strong assumption to imply that once it is realized, people takes the next step in



thinking about whom they are distant from. This logic allows me to come up with another research of grouping people and the effect it brings to the specific people in that group. People categorize other people into groups and identify themselves with these groups, either they are a part of one group or not. By convention, it is expected that people treat their in-group members with favoritism.

However, this is not always the case when findings from Sachdev, Bourhis (1987), Camerer, Nguyen, Tanaka (2010) are mixed and the data are not in favor of simple in-group favoritism regardless how these groups were formed. In fact, social identity theory suggests that positive distinctiveness are sought in intergroup situations, which accommodate the pattern of behavior more persuasively. This suggests favoritism towards the groups in which a person attaches positive identities to, regardless it is an in-group or out-group. As people can have more than one identity at the same time, this brings out the most positive distinctiveness that a group gives a person. For instance, an Asian male who lives in Sweden, works as a hotel manager, owns a dog, has a gym membership and used to be picked on at high school for being overweight can have the following groups that he belongs to: (a) Asian (race), (b) male (gender), (c) foreigner (location status), (d) manager (profession), (e) dog-owner (hobby), (f) gym membership (hobby) and (g) overweight (appearance). These identities are not mutually exclusive, however, he will rank these identities in an order that matters to him. When he interacts with another person, who is inevitably an in-group or out-group member of any of the identities he possesses, group effect will influence his behavior towards that person. It cannot be implied immediately if he favors or discriminates against that person solely based on their group membership. If the group is appreciated and gives him a positive distinctiveness, it is more likely that he will favor the person more. Being a manager is usually well perceived, so an out-group member (employee in that industry) can invoke favoritism. But an overweight person may be treated with little or no favoritism as it categorizes him into a group that he does not wish to be in. Identity (a) Asian is harder to decide, whether he feels positive about it when he lives in another country.

Because of this complex matrix of identity, behavior should be carefully analyzed to propose theories and hypotheses that most accommodate the data. Chen and Li (2009) categorize subjects into groups using a small learning process and random group assignment and find in-group favoritism, less envy for in-group members in both cases. However, the categories in the

mentioned experiment do not have a distinctiveness when compared with each other. Their separation methods are interesting and thorough to test the in-group favoritism, however, the two separating criteria are: red and blue (by chance) and Klee and Kandinsky (working on a task). Either way, both of these groups do not invoke a positive or negative feeling of the group members (red is as neutral as blue in terms of a category, Klee and Kandinsky are names of painters). Although this work by Chen and Li is the inspiration for chapter 4, there are more to experiment than equal categories because people tend to compare and rank categories. Trying to create groups not only with separation but also with unequal advantage (even only in a sentimental way) can take advantage of the identity matrix proposed above.

This chapter focuses on separating people into groups, which either improve and protect their self-esteem or degrade them. Because grouping people invites possible comparison, it is more realistic to study the impact of not only the group effect but also level of interest someone identifies themselves with that certain group. When people interact with one another, speech and appearance are obviously the first impressions, by which someone reveals their religious affiliation (this is only true for certain religions), gender, geographical origin, ethnic origin, profession and social class (Hoodfar 2003). Based on this information, the experiment adopts two categories in separating people: geographical origin and social class (in this particular one is rich and poor). After being categorized into these groups to achieve the group effect, subjects play a game together in which their decisions reveal their preference. Whether they make a social-welfare choice or inequality one, would they sacrifice their own payoff to punish for the misbehavior of their co-player? These choices are not only contingent on the status of being in the same group but also the status of the group itself. High-status groups may exhibit strong out-group discrimination as a defense mechanism against outsiders to maintain their group status.

This research serves the purpose of developing chapter one as it approaches social distance at a larger scale. After the individual social distance is realized, a broader layer of social distance covers as a group identification, by which people connect themselves to or exclude themselves from. This chapter is also important in terms of its scientific location where the economic pay-off maximizing and game theoretic method meet the psychological definition of group categorization and group effect.

The data are expected to support in-group favoritism at varied levels: the high status groups show stronger group effect to maintain their group status whereas low status groups are less enthusiastic about securing the minimal groups that they do not mentally benefit from. It also confirms Doise and Sinclair's (1973) and Commins and Lockwood's (1979) findings where low status group display out-group favoritism for state related performance. This behavior can be interpreted as an effort to change their identity in order to belong to a more positive group or to get rid of the connection to the group to which they attach inferiority. This finding challenges Branthwaite, Doyle and Lightbrown's (1979) hypothesis that low status group are more discriminatory than high status group members. The most significant conclusion of this research is in favor of the social identity theory where it is claimed that discrimination should lead to positive social identity.

When a person categorizes themselves into a group, they derive self-esteem from that group and behave accordingly. Group identity theory suggests that they favor their in-group members and discriminate against the out-group ones whereas the findings have supported other theories as well. It can be argued that group division enhances stereotype effect on both in-group and out-group members. Shih et al. (1999) apply stereotype in their research and find significant impact of performance under the presence of stereotype. Asian American girls who are asked questions to remind them of their Asian identity score significantly higher in a math test compared to the ones who are asked questions focusing on their gender identity. A common stereotype in the United States is that Asian people have better quantitative skills; whereas girls are stereotypically believed to be not as good at math as boys. Group division is expected to have a similar effect as it is also a type of stereotype. By putting people in groups, it enhances the stereotype of “us” and the stereotype of “them”, thus interfering with the decision making process. The implication of which can be applied in management science in cases of eliminating the unnecessary status between groups of employees in order to reduce unfair in-group favoritism. In marketing, certain products can be very well consumed if they are identified with some high status groups because lower status groups will use these products as signals to change their group status.

## **Chapter 2: How does social distance influence public good behavior at the individual level?**

Public good contributions have been an interest for many experimental economists, since evidence has shown that people do not always behave rationally and inefficient equilibria are not always realized. This research compares a public good game run in both China and Germany with 3 treatments in which the social distance factor varies. The outcome shows that under a condition of high social distance, Chinese and German behavior differs with German subjects contributing more to the public good. As social distance decreases, both samples converge to insignificantly different averages of contribution. It is also found that people's contribution is positively correlated with their guess and level of anonymity: the more their identity is exposed, the more they give and the more they believe the other is giving.

### **2.1 Introduction**

Studies and research carried out on public good have been and remain the focus of many experimenters. Why do some people contribute more to the public good whereas others persist with their free-riding strategy? What makes people care more about “the greater good” and do something about it, rather than face a situation where their personal payoff dominates the Pareto-efficient outcome? This research compares conditions in which subjects are discouraged to give less under “the shadow of the future”.

A public good is defined by economic theory as a good that “once it is produced, it can be consumed by an additional consumer at no additional cost” (R. Holcombe 1997). Naturally one may think of it as a magical utility because no additional cost arises for another consumer. But the key and interesting part of this definition is “once it is produced” - which raises a question: who would initially produce this good? The strategic move is to wait on its production and enjoy free consumption, for it bears no additional cost. Empirical evidence supports this theory. This could lead to social failure and non-Pareto-efficient outcomes. This research also employs Paul Samuelson's definition of public goods in which a good “having one or both of these characteristics: non-excludability and jointness in consumption”. Non-excludability means that it

is impossible to exclude another user from access to the good once it is produced and jointness in consumption refers to the zero-additional cost to an additional individual. To be precise, a public good does not carry the meaning “of, related to, or serving the community”. Most of the time, public goods are intangible or abstract so they satisfy one or both of the mentioned characteristics.

This paper debates a kind of public good that is indeed not often categorized or acknowledged as a public good: public behavior. It is something people face almost everyday and affects many psychologically and could determine whether someone has a good or bad day. Imagine someone went to work and had a bad experience at the metro station where people failed to queue up fairly, had to cope with extremely irritating conversations on the train and finally had their toes stepped on when trying to get off. All of this could have a knock-on effect on the way that individual then treats others. This domino effect can, in the end, create an efficient-loss scenario through a sequence of social contacts. Public behavior satisfies both characteristics of the Samuelson definition: non-excludability (once a social norm is established, others can join freely) and jointness consumption (this good behavior is enjoyed without additional cost). Although the jointness consumption characteristic is not 100% clear, since this public good is formed by social convention and sanctioned by others' behavior, it is almost impossible to put a precise price on how much it costs for another user. For example, when staying in a line is socially compulsory, someone who cuts the line will get a strange look or sometimes a word from someone else. This could be the cost of sanctioning misbehavior. Since abiding to a social norm has a cost, it is exactly the cost of producing a public good and punishing or correcting defectors that can be considered to be the maintenance cost. Normally, behaviors are investigated under the scope of psychology more than economics, although behavioral economics has developed greatly over the past years using more concrete methods of research with astounding results.

There have been very few official research studies on public behavior in Germany and China. Common sense tells us there are differences but there is no scientific point in comparing this. Yang Liu (2007) used a blog and her personal experience to compare differences between German and Chinese people in terms of some aspects of their culture and lifestyle. Some of these differences come from culture or habits that do not provide the motivation for further meaningful

research, for example: time of showering, stereotyping each other, meals of the day, etc... However, there are some behaviors that are not only different but also lead to efficient-loss outcomes or create a negative public good for other users, who cannot exclude themselves from this good. For instance, if queuing is compulsory for everyone, it will make most people happier, make it less time consuming and the result less ambiguous. The only factor of the utility function of queuing is time. There is no need to control other unpredicted variables to receive the same level of payoff. If the society's utility function is located at a Pareto-efficient point, finding a mechanism that helps to navigate behavior is optimal. This paper explores the potential economic benefits of identifying public behavior as a public good.

As discussed earlier, public behavior satisfies the characteristics of a public good, thus it is possible to look for factors that enhance voluntary contribution to the public good and apply it to the behavior. Public behavior can benefit people in the community but it needs to be “produced” in the first place and there must be a sufficiently large number of people investing in this good. Good public decorum follows the same pattern in the way it is formed and nurtured. Most of the time, it is believed that culture or social norms navigate this certain behavior and people who fail to abide these norms receive punishments from others. The severity of the misbehavior and its negative impact upon others determines the forms and intensity of the punishment. The sanctioning of social norms can include unfriendly glances, whispers or stating disapproval of the misbehavior out loud, voicing the silent opinion of the majority.

A number of experiments reveal a variable that contributes to a mechanism that changes opportunistic behavior. For example, in the dictator's game, the dictators' decision changes to a more even share of money when social distance is reduced. The more they feel they are exposed to the society, the more they are willing to compromise their own payoff. The “shadow of the future” can affect the present behavior. It does not matter if others recognize someone in the future. The key factor is that someone feels restricted as a consequence of others observing their behavior and they behave better in such cases. (E. Hoffman 1999; Gaechter 2010). This paper examines how social distance affects behavior in a public good experiment where the participation of both players is simultaneous, equal and they can decide their individual payoff at the end of the game. Social distance plays a role in the game of public good by influencing how someone reacts dependent on knowing that others are looking. Their behavior is affected by the

degree to which they feel exposed by the other person. Taking advantage of this factor in sanctioning outliers can be an inexpensive method to maintain and nurture behaviors. However, taking it the wrong way could also result in abusing individuals with the power of the crowd. For example, women who were pregnant outside marriage in some cultures in the 17<sup>th</sup> century would receive a severe punishment of being shaved and thrown into a river, an act that helped reduce the number of unmarried pregnant women in that particular time and place. In this instance, the invisible public good served a purpose but was rather inhumane.

This paper will also discuss which theory public good contributions are inclined towards. The main categories of theory that try to explain public good contributions are the following:

#### Commitment theory

This is built on “Kantian” reasoning, which states that an individual believes in others' contribution as much as their own, therefore contributing regardless of the others'. It is also known as unconditional commitment. Medical research, lifeboat services, blood transfusion services are examples that can be explained by commitment theory (Sugden 1984).

#### Altruism theory

This predicts that someone's contribution is negatively related to another's. However, this model draws criticism from experimental evidence that has been gathered due to its crowding-out effect. Andreoni (1990) argues that pure altruism does not crowd out.

#### Reciprocity theory

This implies that the contribution of agent  $i$  is positively related to agent  $j$ 's. In other words, a player will invest in the public good based on their own belief that the other person is doing the same thing.

These three models have been used to test and classify people's preferences. They explain different scenarios and help describe public good behaviors. However, when using mathematical terms, it is difficult to distinguish between commitment theory and reciprocity theory since both believe that others are contributing more. In multi-period public good games, these models become clearer because reciprocity theory does not tend to have a fixed pattern but instead

follows a random walk, based on the previous period's outcome. This paper attempts to find the relationship between someone's belief and their own contributions to determine if this changes when the social distance variable is manipulated.

Germany has the largest population in Europe and historically has had a strong influence over the European Union. It also attracts many foreigners because of its relatively open environment compared to other European countries. However, the local culture is dominant and those who embrace German culture in everyday life integrate more successfully. (i.e. after a lecture, students knock on the tables as a gesture of appreciation instead of leaving as occurs in the US or Asia).

China has a growing population and influence in the world. When the Chinese travel abroad, there are a number of cultural or habitual misunderstandings they take with them. Kleinman and Tsung-Yi Lin (1981) in their co-authored book “Normal and abnormal behavior in Chinese culture” state that almost no research has compared Chinese communities with other societies. “Chinese studies have paid little attention to individual behavior” when comparing Western and non-Western research on culture. Macroeconomists with a different approach assume there is only one agent whose behavior in the economy constitutes an aggregate while individuals try to maximize their own payoffs.

The experiment to study the individual behavior of Chinese people in a specific setting may help to prove and understand their behavior as a country. By comparing German and Chinese behavior, it is expected that this would translate into a meaningful explanation of certain cultural impacts dependent on social distance. The scope of interest is an attempt to describe public behavior as one kind of public good. This can be related to (but not limited to) attitudes towards smoking, eating healthy food, saving for retirement and living in a sustainable way. Results from a survey by Ipsos MORI in 2010 observed a striking polarization between Germany and China.

There are two conditions under which players reveal themselves: their name and their face, the third condition is a completely anonymous treatment. The experiment was conducted in two countries (Germany and China), to determine the influence of cultural differences on making economic decisions and whether the factor of social distance changes how they allocate some efficient outcomes in certain public good cases. For example, in chart 8 from “Acceptable



Behavior” – Ipsos Mori, support for outright bans against partially-restrictive legislation shows the United States, followed by Germany and Sweden, to be the greatest supporters of paternalism. In contrast, China together with India and Indonesia are at the other end of the scale. A similar pattern is observed in the attitudes to incentives over banning. Conclusions reached from interpreting Chart 8 of their report can include the observation that a country with a higher inequality of power is more supportive of prohibitive legislation. For example, Germans are the least supportive of governmental intervention against smoking of all the nations surveyed. It could be conjecture to say that in countries where public behavior is strongly supported and sanctioned, the need for an official law from the government is not so necessary. Nurturing a public behavior (by forming and sanctioning those committed with possible and acceptable actions) is the cost of producing and maintaining a public good which fits the interest of considering public behavior as a type of public good.

German and Chinese cultural standards can translate into a meaningful research question when these standards play a role in explaining the differences and predicting potential outcomes in social contexts. The most characteristic standards of German culture as stated by Thomas (2003), Schroll-Machl (2003) that may have an impact on this experiment are: separation of personality and living spheres (i.e. rational thinking vs. private emotion), low-text communication (no double meaning), individualism (independence and autonomy). In comparison, Chinese characteristic standards are believed to be: social harmony (avoidance of conflict), face-saving, *guanxi* (network), cunning and tactics (using strategies to achieve one's goal). (Thomas and Schenk, 2005). Comparing a public good game between these two cultures with extreme differences in cultural standards is expected to illuminate how these differences lead to varied and similar outcomes and under which condition(s). Manipulating social distance in an experiment is one step in analyzing those cultural standards and their impacts on decision-making processes.

This chapter is structured as follows: Section 2 cites the relevant literature and discusses my project's contribution to the existing literature. Section 3 describes the experimental design and procedure. Section 4 presents the results and section 5 discusses possible implications and social situations in which more efficient outcomes can be reached.

## 2. 2 Literature review

The literature comes from two main research arrays: public goods experiment and social distance experiment. Public goods experimentalists (Andreoni 2004, Miller, Butts and Rode 2002, Dal Bo 2005) are interested in cooperation in relation with the continuation of the game. Andreoni et al. (2004) stress the significant effect of identification by looking at a photo compared to other treatments which involve control or information treatments. In the information treatment, information about how much others are contributing to the public good is given to each participant but they do not know who the other players in the group are. The result is not very surprising as the information factor does not create any determinant for contribution. In a multi-period game, subjects will learn and accrue information to behave accordingly. When a member starts to free-ride, other members cannot observe who they are and have no power to exclude the free-rider from the game and as a result they will bail out. The information factor is predicted to lower contribution compared to the baseline and especially to the photo treatment. This result shows how much people care about their own and others' identification more than the contribution information of the good itself. In other words, knowing how much others are contributing does not increase as would have been expected. In fact, the result of their voluntary contribution was even lower. People either tend to count on others and free-ride or observe this trend and give up their own benevolence. This is contradictory when compared with Andreoni's (1988) findings where Partners (known players) give significantly less as opposed to Strangers (anonymous players). These partners (known players) are only known as repeat players, so they are not identified individually and only make up the same group. This only represents the information of the group and does not differ very much from the information treatment in his 2004 paper.

Information works very subtly in most of the experiments. There are some critical points that change people's behavior given the information and critical points in the information itself that determines if it performs well or badly on the behavior. A field experiment from Charness and Cheung (2013) suggests that asking for donations can yield significantly different outcomes with the guideline information. \$2.00 was too much and nothing at all (\$0.00) was too little. It turns out that a suggestion of \$1.00 yields the highest revenue. We do not know exactly what the mechanism behind this is, but as a result, information manipulation is extremely powerful. This

seems to contradict Fischbacher and Gächter's (2010) experiment where they observe people's contribution in one period is highly and positively correlated to how much other members of their group contributed in the previous period, including their own belief about that previous period. In this paper potentially, the two variables "others' contribution in period  $(t-1)$ " and "belief in period  $(t-1)$ " are correlated. This makes both of them significant in the OLS analysis. Given this information, orders of periods do not matter, subjects do not distinguish between periods 1-5 from 6-10, providing they collect information on the way and make their decision based on the previous period. This result is in accordance with R. Croson's (2006) findings where a person's contribution is positively correlated with their belief in another players' contribution.

The contribution level is even more sensitive when information goes further and becomes mutual. This is known as different levels of social distance. Researchers have varied definitions of social distance, none of which tend to be controversial or disregard each other. Hoffman et al. (1999) consider social distance as "*the degree of reciprocity that subjects believe exist within a social interaction*" and confirm that high social distance induces changes in behavior. A more unilateral definition is used by Bohnet and Frey (1996) to stress the importance of *identifiability*. When interaction is anonymous, people behave differently towards "the victims" who have already been chosen as opposed to the ones who would be chosen later in an experiment. Social distance is driven by a comparison of one's self to the other by taking a first person's perspective vs. a third person's perspective (Ein-gar and Levontin 2013). This is a psychological approach to understanding social distance. However, the finding is consistent with the existing literature. When social distance is high, the identifiability victim effect is less likely to occur. Communication between participants is proved to significantly change cooperation levels and stability of cooperation (Brosig-Koch and Ockenfels 2003). Why does information and communication matter? Do people really negotiate through communication? A theory of future interaction that affects people's present behavior seems to explain this. Hoffman et al. (1999) observe six treatments with decreasing levels of social distance and reject the null hypothesis that the money offered in a dictator's game does not differentiate across treatments. In fact, the more a person feels exposed to others (experimenters, other players, etc.), the more they tend to split the money to reach a fair deal. Further research by Bohnet and Frey (1999) confirms that social distance significantly interferes with mean offers in a Dictator's game. The anonymous treatment encourages a majority of subjects to give nothing. In contrast the

contribution increases in the one-way identification and is almost a fair division in the two-way identification. Dal Bo (2005) calls this “the shadow of the future” that affects behavior. “Prisoners” in the Prisoner’s Dilemma game demonstrate more cooperation when the probability of continuation increases. When this probability is equal, an infinitely repeated game also encourages a higher percentage of cooperation compared to the finitely repeated game. It may raise the question, how big is this “shadow of the future”? Does it only narrow in the scope of the game or are people generally more cautious in future interactions. As a result, having one’s identity revealed can change an individual’s analysis of their present behavior. An experiment by Charness and Gneezy (2008) shows a big difference between the dictator’s behavior in the name and no-name treatments. The name treatment makes the offer closer to a 50-50 split although it is uncertain that this is linked to generosity as other conditions remain unchanged. A person may not remember another person’s name for a very long time and the chance of meeting the person with that name again in the future is minimal. However, the introduction of a name in the game can have an impact in turning the behavior towards a fairer outcome.

R. Croson (2006) distinguishes three contribution models and finds 92% of subjects’ behavior is consistent with the reciprocity model. This implies that most people will do the good thing only if others also do it. The coefficient of the person’s belief is positively and significantly related to their own contribution. In this research, it is expected that there will be a shift of belief over three levels of anonymity as well.

Cross-country studies literature is another source of literature that this research is based on. Papers from Roth et al. (1991), Cameron (1999), Buchan, Croson and Johnson (1999) and Kachelmeier and Shehata (1992) use subjects from different countries to discover potential differences in behaviors that can be attributed to cultural diversity. In Buchan et al. (1999), the behavior by the Chinese subjects is not statistically different from those of the Japanese and Korean as compared to the behavior of the United States’ subjects. This could indicate that behavior from these three cultures is similar as compared to western American behavior which is different. The difference is negligible among similar cultures. This result is consistent with Yamagishi and Yamagishi (1994) who determine that American respondents are more trusting than Japanese subjects in a cross-national questionnaire survey. Furthermore, the differences in bargaining behavior among people from Israel, the United States, Japan and Yugoslavia from

Roth et al. (1991) are argued as attributable to cultural differences rather than languages, currencies or experimental factors. The observed bargaining outcomes deviate greatly from the predicted equilibrium and there exists a substantial difference between these four countries. This is evidence for intercultural experiments to be in favor of varied outcomes explained by cultural differences.

## 2.3 Experiment design

### 2.3.1 Treatments

The purpose of the experiment is to study the behavior of subjects in a public good scenario combined with differing levels of social distance. The comparison of these is between two samples of German and Chinese subjects.

There are three treatments, two of them consisting of two phases: pre-experiment training and the game itself (Invisible treatment and Name treatment respectively). The third treatment (Visual treatment) includes another interacting phase. The Invisible treatment guarantees subjects' absolute anonymity between each other. The Name treatment reveals the opponent's name in the diagram before making a decision. The Visual treatment involves a quick visual interaction with each other prior to their choice of investment. The experiment is designed to be a one-shot game in order to reproduce a public good situation in which subjects interact with each other only once. In all treatments, every subject received an initial endowment of 50 points. (=5 euros in Germany and = 40 RMB in China after taking the real exchange rate into consideration. This was used instead of the classic Big-Mac rate. The points were converted with the exchange rate at that time of 40 RMB = €4.81). The subjects would face a choice of how much to invest in the private fund and how much to invest in the common fund. The word “invest” is used instead of “keep” or “give” to enhance the effect of loaded language. The common fund would be divided equally between both players no matter how much one invests in it and grow by 1.5 after both decisions were made. We can formulate the payoff function of player 1 as:

$$\pi_1 = 50 - x_1 + (1/2) \cdot (3/2) \cdot (x_1 + x_2) = 50 - (1/4)x_1 + (3/4)x_2$$

The first partial derivative with respect to  $x_i$  yields a negative constant (-1/4). This suggests an equilibrium where none of the players invest anything in the common fund and keep everything

to themselves. This is a typical public good problem where people free-ride the good and wait for others to produce it.

Subjects were also asked to guess how much the other person would invest in the fund. If their guess is correct (with a tolerance of 3 tokens), they would earn another 20 tokens.

### **2.3.2 Procedure**

The experiment involved the participation of 174 students after omitting backups and irrelevant participation. The participation rate was 93%. Subjects played a one shot game and no one took part in more than one treatment. In the Invisible section, the students could actually see other players in the same session but were informed that each of them would be matched with another player from another room. They did not play against any of the players they saw in their room. There were two morning sessions and two afternoon sessions for each treatment, each of the sessions recruited 6 to 12 students and lasted about 1 hour. The Chinese subjects were collected and the experiment was conducted at Renmin University in Beijing (Keyan Building) with pencil and paper and earned RMB 34.45 on average. The German subjects came from the University of Duisburg-Essen and earned €9.56 per student on average. At the beginning of the experiment, subjects were introduced to the game, encouraged to ask questions and solve some examples in given situations with different investment decisions. They were asked questions and given examples to work out how much someone earns. None of the examples gave induced navigational hints like “what should you do?” or “how much should you invest, given the other player invests (0, 10, 25, 50) points?” An example was given of subjects guessing how much the other person would invest in the fund. If they were correct (with a tolerance of 3 tokens), they would earn another 20 tokens. These steps were explained to ensure that subjects understood the game.

There are three treatments in which level of anonymity varies. In the Invisible treatment, subjects were asked to make their own investment decision on the form and wait for their partner to finish. The results were matched later to calculate how much each of the players earned and paid with discretion. The Name treatment was carried out using a strategy method for logistical reasons. The Name treatment involves the same training phase but the subjects must write down their name on the form. The strategy method was used to increase control over the player's

interaction. Subjects were pre-determined with whom they would be matched. For example, subject 1 had been pre-chosen to play against subject 2, so the answer sheets were printed with one of the names on it and the subject must fill out their name later. To ensure forms matched the correct subjects, they were given an individual code i.e. MS2P3 (morning session 2 player 3) when they signed up for the experiment. Before participating, they had to register their attendance with the experimenter using their code. The experimenter matched their code to their name but subjects did not feel that they were revealed to the experimenter. The treatments took place on different days and this procedure made it possible to check that no one actually took part in more than one treatment. This would ensure that the assumption of the statistical tests to be used later would not be violated. The subjects made their choices based on the two questions: “how much do you guess the other is contributing?”; “how much do you decide to invest in the common fund?” The forms were collected and matched to calculate individual performance payoffs. In the experiment using pre-determined players, the full name of a subject was exposed rather than using their last name only (as discussed in the previous literature review). This enabled the subjects to also determine the gender of the other player. In the third treatment, subjects knew their partner's gender, making one less significant error term because these two treatments would be equal in the econometric model to be analyzed later. In the original settings, they were given 2 answer sheets, one with a male name and one with a female name on it and later, these results were compared but they yielded an insignificant result so the analysis was not included in the result section.

Treatment 3 (Visual treatment) includes one more phase after the training. Subjects were asked to look at the webcam of a laptop and see the other player for 20-30 seconds (without any sound). After this interaction, the camera was turned off and subjects went on with their decision making in the same way as in the Invisible treatment. For this treatment, I used two laptops connected to the internet and Skype so that they could see each other. The sound was muted the whole time so there was no verbal communication, the skype ID was registered only for the experiment and subjects did not reveal any personal information about their skype ID or any other application. When seeing each other briefly, there might be bias toward the other's gender hence the players had been pre-matched to eliminate gender favor. Slonim and Guillen (2010) reports a significant discrimination of male decision-makers in favor of female partners in terms of both being selected and the amount of transaction in a trust game. In the same experiment, data supports

men against men discrimination but not women against women. To ensure concreteness, this study matched male subjects with each other to avoid potential white noise in the analysis. Subjects were also told not to make any kind of non-verbal communication.

### 2.3.3 Conjectures

*Conjecture 1: As social distance decreases, contribution increases.*

It is believed and statistically proven in Hoffman et al. (1999), that the greater isolation between one and the other, the less likely that reciprocity is realized. Although other researchers may define *social distance* differently, there is empirical evidence of changing behavior(s) under different levels of isolation. One important feature of social distance is identification, based on which one person can be recognized by others (this can be one's name, face or other personal features that distinguish one from another). Identification has two effects on a person: (a) the person feels responsible for themselves when exposed to another person. The image of the person is attached to their behavior and the degree to which they are revealed. Any bad behavior can affect their image. It can be even more complicated in everyday situations that involve an outgroup match as a person may have to behave in a certain manner for the sake of the image of a specific group. (b) The other is probability of future interaction. The person wants to avoid retaliation or embarrassment in the future for bad behaviors in the past. This occurs when the chance of being recognized increases.

German culture emphasizes individualism whereas Chinese culture stresses face-saving behavior. These differences can lead to crucial behavioral outcomes due to impacts on identification. It is expected that in one of the treatments, contrasting levels of contribution will be demonstrated.

*Conjecture 2: Guess and contribution are correlated.*

There have been theories used to explain economic behavior in altered settings of a public good game. The most popular are: commitment (positive contribution regardless of the other's contribution's), altruism (positive contribution given that the other person does not), reciprocity (positive contribution given that the other person also contributes) and self-interest (zero contribution regardless of the other's contributions). It is expected that reciprocity theory fits as behavior in tax evasion (Bordignon 1993), gift exchange (Kranton 1996), public good provision

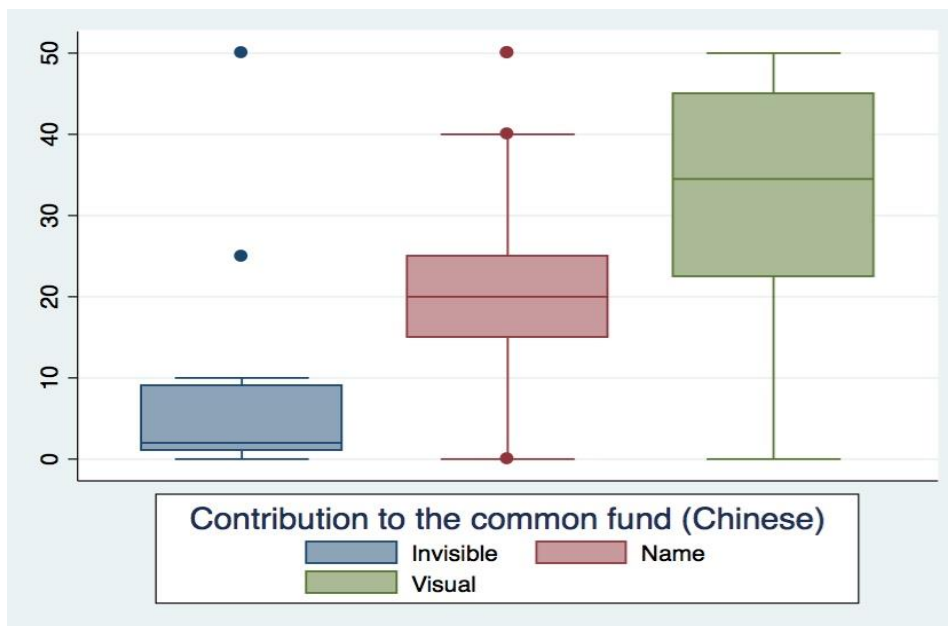


(Hollander 1990), helping in the workplace (Frey 1993) with the presence of social distance. This setting with the “guess” tries to capture and observe which theory is applicable and if there is a potential difference between Chinese and German culture in the theory of contribution. Chinese culture presents itself using double-meaning communication, which can be expressed through the “guess” (higher or lower in comparison with their contribution). German communication depends on directness. It may be the case that German guesses are closer to their actual contribution.

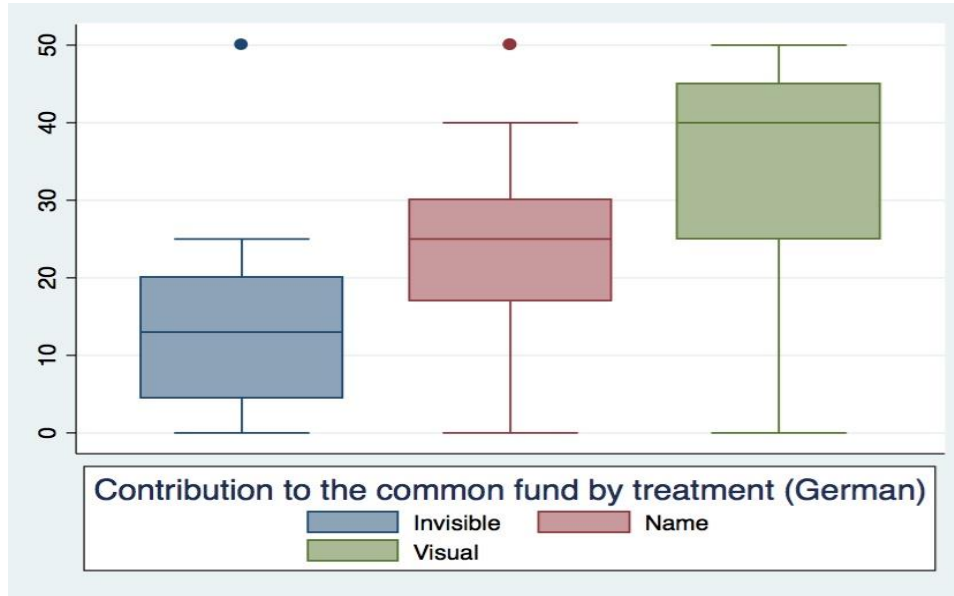
## 2.4 Results

Overall results: 86 subjects participated in the Chinese samples and 88 in the German one, making 174 individual choices which constituted my raw data base. Chinese subjects invested 19.53 points in the common fund on average with a standard deviation of 1.76 while Germans put 23.76 points (standard deviation 1.63) in the common fund. Figures 1 and 2 illustrate in detail the median and percentiles of each treatment of both samples.

**Figure 1: Overall result of Chinese subjects**



**Figure 2: Overall result of German subjects**



*Observation 1:* As for the Chinese sample, as the level of anonymity decreases, more equal offers were made. Table 1a shows the average of contributions to the common fund of the Chinese sample in all three treatments. It suggests that net contribution increases as the level of anonymity decreases. A Kruskal-Wallis test on the treatment reveals a significant increase across treatments ( $p < 0.001$ ).

**Table 1a: Kruskal-Wallis test across treatments of Chinese subjects**

Treatment	Number of obs.	Rank-sum	$R^2$	p-value
Invisible	28	583.5	39.59	0.0001***
Name	30	1420		
Visual	28	1737		

Robust standard errors in parentheses  
 \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

To be precise, the difference between Name and Visual treatment may not be the same as the difference between the Individual treatment. For a Kruskal-Wallis test, this could be a problem as the test does not take this information into account. As a result, pairwise Wilcoxon rank-sum tests were called and this conjecture was significantly confirmed ( $p < 0.01$ ) for each pairwise comparison.

**Table 1b: Pairwise Wilcoxon rank-sum tests between treatments**

	Invisible	Name	Visual
Invisible	-	-	-
Name	$z = -4.746$ $p < 0.0001^{***}$	-	-
Visual	$z = -5.322$ $p < 0.0001^{***}$	$z = -3.102$ $p = 0.0026^{**}$	-

Robust standard errors in parentheses  
 \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

It can be concluded from this that a visual interaction alone can be more compelling than one's full name in terms of exposure (for this particular Chinese sample). This contributes to the literature by giving evidence of a comparison of forms of anonymity and social exposure.

*Observation 2:* German subjects' contribution also witnesses an increase as social distance is relaxed. A Kruskal-Wallis test among three different treatments was run (Invisible, Name, Visual) and yielded a significant level of rejecting the null hypothesis ( $p < 0.0001$ ).

**Table 2a: Krusal-Wallis tests across treatments of German subjects**

Treatment	Number of obs.	Rank-sum	R <sup>2</sup>	p-value
Invisible	28	729	27.11	0.0001***
Name	30	1364.5		
Visual	30	1822.5		

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Similar to the Chinese sample, Wilcoxon rank-sum tests were used to distinguish the individual treatment's contribution to the variance. Table 2b summarizes the pairwise comparisons and the Individual treatment was significantly lower in contribution mean compared to the other two ( $p<0.001$ ). The difference between the Invisible treatment and the other two was predicted but Name and Visual treatments showed significant differences but only to a  $p$ -value of less than 0.05.

**Table 2b: Pairwise Wilcoxon rank-sum tests between treatments**

	Invisible	Name	Visual
Invisible	-	-	-
Name	$z = -3.31$ $p < 0.001$ *** $n=58$	-	
Visual	$z = -4.78$ $p < 0.0001$ *** $n=58$	$z = -2.71$ $p = 0.007$ ** $n=60$	-

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

This is interesting as the same experiment reported different results within the two samples. Naturally it can be argued that many different reasons may have contributed to the difference between the two samples. It could be deduced that if social distance is great, a different contribution would be expected. One mechanism (i.e. contribution to public good) could be more effective in some cultures and less significant in others. German subjects are more sensitive to exposure but there is less distinction between the types of exposure of name and visual. As a result, the Invisible treatment's contribution was lower than that of the other two treatments but as soon as identification presented itself (of any type, in this particular experiment i.e. name and appearance), they started to "behave better" in the public good game.

*Observation 3: Invisible Chinese vs. Invisible German.*

A Wilcoxon rank-sum test was employed to compare the contribution to the common fund between the Chinese and German samples ( $z=-3.31$ ,  $p<0.001$ ). The result was significant to a  $p$ -value by 0.001 suggesting that under a high level of social distance, German subjects contributed more to the common fund than the Chinese subjects.

**Table 3: Wilcoxon rank-sum tests between samples**

Treatments	z-score	p-value	n
Invisible Chinese vs. Invisible German	-3.09	0.0001***	58
Name Chinese vs. Name German	-1.58	0.11	60
Visual Chinese vs. Visual German	-0.38	0.71	60

Robust standard errors in parentheses

\*\*\*  $p<0.01$ , \*\*  $p<0.05$ , \*  $p<0.1$

The average contribution of German subjects is 13.04 compared to the contribution of Chinese subjects of 5.86. In this treatment, 46.43% of the Chinese subjects decided to completely free-ride and place nothing or 1 point in the fund compared to 21.43% of the German subjects. This established a benchmark for further comparison without prejudice against any group.

*Observation 4:* The Name treatment between German and Chinese demonstrates an insignificant difference to a  $p$ -value of 0.11 (Wilcoxon rank-sum test,  $z=-.158$ ,  $p=0.11$ ), which is less strong than the Invisible difference. If it is a one-tailed test (suggesting that Germans put more in the common fund), it is significant to a 0.1 level, however this may be arbitrary. Observation 3 creates a benchmark for consideration and it is justifiable to apply a one-tailed test to the comparison between German and Chinese subjects in the Name treatment. It can be seen that as soon as subjects are less socially distant, the difference in contribution is less potent. The number of total free-riders (who contributed 0,1 point) also reduces and when considering the Name treatment the two samples, (German and Chinese subjects) are not so different as between the two samples in the Invisible treatment.

*Observation 5:* The Visual treatment comparison between German and Chinese does not differ significantly. The mean contribution of German subjects was 34.03 points while the Chinese subjects invested 32.32 points on average. Again, even though the number of observations is sufficiently large, a Wilcoxon rank-sum test is preferred and the difference is insignificant ( $z=-0.38$ ,  $p=0.71$ ). It is not surprising and anticipated that when social distance is reduced, subjects behave with little difference and Pareto-efficient.

*Observation 6:* Contribution is generally correlated with one's belief about the other player's contribution.

Using the OLS model:

$$\text{CONT} = \alpha_1 + \alpha_2 \text{GUESS} + \alpha_3 \text{TREAT} + u$$

it is shown that  $\alpha_2$  and  $\alpha_3$  is positive and significant (table 4).

**Table 4: Regression on types of treatments**

Intercept ( $\alpha_0$ )	- 4.29 * (1.74)
Guess ( $\alpha_1$ )	0.75*** (0.05)
Treatment ( $\alpha_2$ ) $\beta_i: i = 1, 2, 3$	2.48* (1.03)
N	174
R <sup>2</sup> adjusted	0.71

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

This means that: if one subject believes the other is willing to invest in the common fund, they will correspond and behave with generosity. This is in tune with the reciprocity theory where one's contribution is positively correlated with the other's ( $>0, x_i^*>0$ ). This confirms that the reciprocity model in the public good game is more significant than the other models. The model in which the subject invests in the public good no matter how much they believe the other is putting in the common fund and the other model which is negatively correlated with the subject's belief about the other's contribution. The existing literature debates which model works best as an attempt to explain people's behavior in charity, public goods and other social contribution models. This finding contributes another data base confirming the reciprocity model, suggesting that in the public good model, people are greatly concerned with how much others are investing in when they consider their own decision.

*Observation 7:* Belief is correlated with types of treatments, as anonymity reduces, beliefs increase. From the regression equation,  $\alpha_3$  is positive and significant ( $p=0.017$ ), it can be

concluded that as one shifts from treatment one to treatment two (Invisible treatment to Name treatment respectively), the contribution to the common fund is expected to increase by 2.48 points.

## **2.5 Discussion**

Given that public behavior and decorum are one kind of public good, these findings suggest that the more the subject feels exposed to the community, the more they contribute to public behavior. Result 1 and 2 confirm this to be the case in both German and Chinese samples, so it appears not to be dependent on culture but rather can be applied regardless of environment. For better public behavior, education plays a significant role but given that education differs within cultures, the social distance can be an efficient tool to expect people to behave constructively. For instance, a sign of social exposure (verbal signs, cameras, convex mirrors) can reduce social distance and create a decisional point for behavior and those who do not comply with the rule will feel that others are observing. Naturally it should not cross the border of individual privacy.

Result 3 can be a little controversial as, under a high level of anonymity, Chinese subjects contribute less. It explains certain public goods or public behaviors in which German subjects are more charitable or constructive. Queuing to get on the metro or train can be an example, although in this case people's faces are exposed. However, taking into consideration the fact that the city is large and the chance that people know each another is small, it can be considered anonymous in these instances. German people tend to rush for the entrance less and yield the way for more efficient exiting and entering, even when time spent on the train is longer than time spent on the underground. It can explain why some behaviors work differently especially when people don't reveal their identity. It seems a slight surprise that Chinese culture emphasizes face-saving and group thinking, which does not exhibit its impact in this experiment, whereas German individualism does not imply immediate utility maximization. However, it can be explained by the fact that when social distance is high the face-saving effect does not count, hence it is more difficult for the public behavior to be produced and maintained. In the mindset of someone who knows about face-saving but it is not presentable, it may be seen as an opportunity to free-ride the public good as opposed to someone from a culture without it.



Result 4 starts to witness the insignificant difference between the two targeted samples, however it is dependent on preconceptions. The  $p$ -value is about 0.11, which can be considered significant if it is arbitrarily hypothesized that German subjects contribute more to the common fund. It is observed that subjects behave better under a lower level of anonymity, as compared to the greater amount they feel exposed by giving their name to others regardless of whether they are likely to meet again. The application of this can be obvious for public good and behaviors. It can promote using names of people, as it is expected that when people's names are recorded they attach more responsibility to their behavior.

Result 5 confirms the hypothesis that subjects are not so different when they are exposed by identification and behave mutually beneficially. This gives hope for public behavior to be better or more socially constructive when people know their image is being seen by others. At the end of 2013, there was an accident of a lorry packed with beer cans in Vietnam. Many locals, instead of helping out, took the cans home. Not long after the incident, the scene was broadcast on the news. This resulted in some people expressing their regret and intention to reimburse the loss to the driver even though they were not actually charged with theft. It is generally known that some cultures or certain societies behave with some stereotypes (when it is positive, it is known as reputation). If this is applied to any culture, the result may not differ greatly from each other. This turns out that it is not wrong but it can simply be equally good for any other group as long as they receive the same mechanism, in this case it is the social distance. For instance, Germans have a good reputation as viewed by foreigners for their punctuality (which may not always be true) but it can be established if one given society considers being late rude. After a period of trial and error, it will reach the same state of punctuality and benefit most people who construct this habit.

There have been different models that attempt to distinguish kinds of and motivation for public good which in this case is explained by the reciprocity model “I will do the good thing if you will”. The correlation between contribution and belief (observation 6) portrays this feature in the public good game in both samples. Contribution is positively correlated and significant with their beliefs. The subject believes the other is contributing, so they also contribute but if they invest little then their expectation is also low. For future research, if it can be set up as a multi-period game, it can be designed to evaluate if the consistency of behaviors among different periods is

maintained or whether it will lead to a completely lose-lose situation. On the contrary, it can be the case that the subjects signal cooperation and adjust to a Pareto-efficient outcome. In the public good game, if the public behavior is set it forms a social norm and people generally believe that others will behave in this manner (in this case invest in public behavior) and thus behave accordingly. This explains why some cultures are so dominant that foreigners blend in willingly in a relatively short time. This is the step of establishing a good public behavior as common knowledge, hence the culture expects constructive behavior from others.

People's belief and contribution together correlate with this type of treatment. As a subject feels more exposed, they give more, as they believe more in the other. This is important as trust is one kind of socially essential capital, which is a lubricant in economic life and reduces transaction costs in situations of incomplete information. Guessing how much the other is giving and behaving accordingly may not be an appropriate measure of trust. However, it can be considered as an assurance (Yamagishi, Yamagishi 1994): “assurance is based on the knowledge of the incentive structure surrounding the relationship”. The subtlety of trust is higher as its interference on behavior comes from expectation of mutual traits and intentions. Assurance is nonetheless sufficiently efficient in abiding to a social norm in favor of a mutual benefit. When it is abundant, people spend less time controlling each other. This does not mean that we have to record everyone everywhere, however sometimes it is necessary to make people expose their identification in public good situations, as not only their behavior is improved but also their trust increases. This encourages a large number of constructive donors and creates a state of establishment, the outcome of which is high and sustainable.

## **Chapter 3: Social distance approaches people as a piece of collective information-**

### ***An experiment with corruption.***

Corruption has been an issue of concern for governments around the world and a topic of interest for a number of researchers with different approaches. This research aims to unveil the mechanism by which corruption is vulnerable to being reported. Also, it offers a new direction in testing an important determinant of corruption using an experimental approach rather than the traditional econometric technique: the power of information. The results show that punishment is more effective in a developing country as opposed to the information factor. When people encounter corruption on a daily basis, it becomes more justifiable, so until they know there will be a price to pay they still turn a blind eye to corruption or even take part in it.

### **3.1 Introduction**

Corruption has evolved through different forms ever since human beings started to share their agricultural and hunting products. The growing interest in studying corruption has shed light on its mechanisms and determinants. It has been shown to be an international problem rather than an internal one of a single country, especially under the threat of international banks and funds. 53 out of 174 countries scored above 50 against a scale of 100 (equivalently to being perfectly clean) by Transparency International in 2012. The World Bank estimated that 1 trillion USD is paid as bribes out of the 30 trillion in total of the world's economy in 2002-2003 (Rajeev K. Goel and Michael A. Nelson). Denoted by red, most corrupt countries span Asia, Africa, South America, leaving a fairly small area of the map indicating the least corrupt ones denoted as

yellow (Transparency International Perception Index 2012). Corruption is detrimental to the development of an economy and it creates ambiguity about social services, causes a brain-drain of highly educated people migrating to more developed societies and triggers potential political turmoil. Corruption, in many models, “has a substantial explanatory power for economic growth”. (Ali, Isse, 2003)

In the same report, Vietnam ranks 123 out of 174, falling from 112 in the previous year despite the Communist Party’s attempts to reduce corruption. Lenient punishments (most of which have been framed as “irresponsibility causing serious consequences”) have encouraged corrupting behaviors. Compared to other countries in Asia, Vietnam had the highest rank of allegations submitted to the Integrity Unit (48) (Ngan Nguyen, World Bank Report 2012). There has been little official research conducted or studies published regarding the current state of corruption in Vietnam. Those available are merely pieces of news from newspapers, most of which are subjective, without concrete data or methodology.

The nature of corruption is, however, less tangled and can be reasoned as a solution to a maximization problem with constraints on the law and moral standards. Under the homoeconomicus assumption, it is relatively understandable that an agent engages in corruption when constraints are relaxed. In fact, in both micro- and macroeconomic findings, the results support the theory that people, regardless of where they come from, are prone to corruption when opportunities become feasible. Ali and Isse (2003) find no impact of ethnicity on corruption in a model consisting of education, foreign aid, government size and political freedom. Gangadharan et al. (2009) test the significant levels across samples of Australia, India, Indonesia and Singapore and concludes: for the corrupting behavior of initiating a bribery, the samples do not differentiate from each other across cases. It is defined as “a situation where two

people can act to increase their payoff at the expense of a third person, the victim” (Gangadharan et al. 2009). This research employs this definition for the purpose of finding the determinants of corruption from the behavioral aspect.

The view of corruption is not completely uncontroversial. Most researchers consider it to be a problem rather than a harmless redistribution of wealth. Mauro (1995), Klitgaard (1988), Shleifer and Vishny (1993) believe corruption hinders economic growth, expands the gap between the rich and the poor, causing the malfunction of public institutions and social wastefulness of resources. Others prior findings from Leff (1964), (1979) actually suggest that corruption results in social efficiency and political management as this amount of payment somehow makes up for the low salary paid by the government, hence, helping cut costs in managing states. (Tullock, 1996).

There are many ways to categorize corruption, but it is most commonly identified as collusive and non-collusive corruption. Shleifer and Vishny (1993) distinguish these two types as *with theft from the government* and *without theft from the government*. The without theft corruption is understood as an extra cost added to the service when an official performs a duty. For instance, a firm that wants a special allowance to import or export certain kind of goods is expected to give the custom official a bribe to obtain this. This kind of corruption encourages officials to signal for a bribe and those who wish to benefit from special services to pay more money. Naturally it can lead it an extreme case where a bribe is compulsory in return for a normal service. This became the case in many fields in Vietnam in the 2000s, where people were expected to pay extra when going to the hospital or many other government offices. However, the government does not lose financially in this case since the officials only add up to the service they are supposed to do for a living. (In the long run, it leads to potential riots and a collapse of the

system). The other type – collusive corruption - refers to an act where both sides of the bribe have the incentive to hide it, thus officials steal from the government. For instance, when a policeman, instead of giving a citizen a fine for speeding, can offer one half of the fine to the citizen and clear the situation. This type of corruption gives the people a misguided notion that laws and government can be distorted and negotiated, regardless of what they have done.

Since corruption is illegal, a binding contract is not granted even after the offer is made. Punishment is, however, a possibility if the deal is disclosed and this imposes its consequences on the related parties. A number of researchers have included this as a threat in their experiments to measure its impact on corruption, mostly it is agreed that punishment has a negative explanatory coefficient on corruption. Naturally this effect varies by settings, framing, cultures and other factors. Abbink and Hennig-Schmidt (2006) employ punishment as a “sudden death” outcome where the briber and the person being bribed are expelled from the game with a clear balance – representing a case where a person loses both her job and money upon disclosure. Gangadharan et al. (2009) uses a less harsh punishment scheme, where the price for taking part in the bribe is calculated by financial loss. Most experimental papers on corruption focus on players’ payoffs to manipulate the punishment scheme, which has proved to be by far the most efficient tool in fighting corruption. But in different econometric models, other researchers take factors like education, foreign aid, size of government, democracy, etc... into account. Most of these factors seem hard to mimic in an experiment, especially when the samples chosen are usually a small, homogeneous group of people. This research makes an effort to frame a part of democracy as a type of punishment. Work by E. Hoffman, McCabe, Fehr (1999) and Fischbacher (2010) identify a significant impact of the shadow of the future upon present behaviors. The question asked is, when information is public and available, do people take this

into account in their behavioral matrix, even though this information may not refer to individuals? Transparency International has ranked Vietnam 172 out of 179 for freedom of press in 2011 – 2012. The countries at the bottom of this list are also familiar with the corruption index list, which again advocates the point that corruption and freedom of press are negatively correlated. Although the punishment scheme using public information in this experiment does not disclose or name any other individual identities of subjects, it is an attempt to see if information really plays some role in signaling the related parties, especially the role of the citizen in detecting and reporting corruption. The experiment is intended to run in Vietnam due to its position of corruption and freedom of press. After several incidents like journalist Nguyen Van Khuong being arrested and receiving a four-year jail sentence for undercover reporting of police corruption, or the imprisonment of other bloggers, it is necessary to test if the public are sensitive to this fourth power. It is almost impossible to test democracy in an experiment but a public flow of information can be used as a proxy to estimate how strong it can be.

Hence both financial punishment and public information (used as a kind of punishment) are employed in this experiment to test the impact of material punishment as a traditional tool, together with the role of public information given in a separate treatment and finally another with both tools.

Which setting should this experiment follow? A two-person game, a three-person game or more? There are several approaches to corruption experimental designs and it depends on the researchers' point of view of corruption and which factor is to be tested. A 2-person game is easier to set up, however it is closer to a trust game and tests mutual reciprocity (in this case it is an illegal contract). A 3-person game seems most appropriate in this experiment to test the strength of treatments towards counter-equilibrium behaviors. Naturally there are more

complicated settings, for instance, 8-person or 16-person games designed by Abbink (2002) which have their own advantages and may be more appropriate for other hypothesis testing. A similar question can be raised regarding whether the punishment amount should be a range or fixed. This will be further discussed in the experimental design section.

### **3.2 Literature review**

Corruption has been an area of interest in many researchers' papers and not exclusively in the field of economics. There are mostly two main approaches in the field: econometric analysis where data is collected and run in relation with variables to identify factors of correlation, and a more recent approach where experimental economics plays the role of testing different sides of corruption. Ali and Isse (2003) employ a multivariate model and find a correlation between corruption and other factors. The significantly negative coefficients include level of education, judicial efficiency, political and economic freedom. Corruption is found to be positively correlated with foreign aid and the size of a government. These are what the researchers call "determinants" of corruption, which are interesting to test for using a behavioral approach (naturally it is more difficult to reproduce some of these features in an experiment). However, political freedom is an aspect that this research considers and so adds a new approach to the existing literature. Findings from Ali and Isse also support evidence that corruption is harmful to development in the long run as the corruption index is strongly correlated with itself in the previous unit of time. Thus, it cannot be justified as an added tax or welfare enhancing phenomenon as it eventually leads to problems that are out of control. Ethnicity is found to be insignificant across cultures, as expected, since corruption can be a natural behavior of maximizing one's utility at the expense of others. In Gangadharan's paper, this is also the weakest difference in the result. Therefore, a comparison across samples is not involved in the



interest of this research. What about sex? Does gender difference play a role in the gender in this type of behavior (since some researchers have found a significant increase in return in the trust game between genders in the past)? D. Dollar, R. Gatti and R. Fisman (2001) use the *International Country Risk's Guide* data as an attempt to measure corruption levels across samples with different levels of female participation in parliament. The result supports a higher ratio of female participation in the parliament as it is negatively correlated to corruption to a significant level. However, it may be a strong assumption to conclude that females engage in corruption less often. In fact, the model itself admits that both factors are correlated to development, proxied by per capita income. In other words, the result can be misunderstood and projects a message that looks fair but may not be what they really mean. Countries with a high female participation in parliament have different social structures, punishment schemes and welfare systems, hence may create such an effect on the regression. (It may be true that weight and height are correlated, but on each individual, putting on more weight does not result in getting taller). In this experiment, the attempt to distinguish corruption behavior between male and female subjects is not made. Rivas (2013) uses the setting of Abbink's experiment to distinguish the rates of corruption between male and female, and concludes that men are more corrupt than women. In Abbink, Irlenbusch and Renner's (2002) experiment, a situation of bribe is reproduced with three separate treatments called *Pure Reciprocity Treatment*, *Negative Externality Treatment* and *Sudden Death Treatment*. As one of the pathfinder' papers in experimental corruption, this research confirms the reciprocity in corruption behavior when the contract is signaled and made, as subjects are likely to take part in the commitment. However, the *Pure Reciprocity Treatment* is somewhat similar to the Trust Game but with different wording. It is therefore not too far from predicting that the game will work. The *Negative*

*Externality Treatment* introduces a cost on everyone in the session whenever the second mover (the bribee in this case) chooses to accept the deal from the briber. This is a smart setting as it reflects the scenario in corruption where the outcome hurts everyone but those who benefit from it will still earn a net profit. This is not Gangadharan's (2009) setting where this profit is made at a particular third person's cost (which is more the case of corruption which this research attempts to test). Also the *Sudden Death Treatment* mentions a case where all of players' earnings accumulated throughout the game will be swept away upon discovery but only with a probability of  $\theta=0.003$ . This probability is so negligible that I doubt the effect of the threat it brings to players, or more or less it is the wording of it that actually navigates subjects' behavior during the experiment. However, the result of this treatment turns out to be surprisingly supportive of punishment as a tool against corruption (with a Mann-Whitney U test). Subjects also tend to underestimate the threat of disqualification from the game (observation 4), therefore it must be something else that makes transfers in the *Sudden Death Treatment* significantly lower than the control treatment. They also find different rates of corruption in different settings of language (namely loaded language vs. neutral one) (Abbink, Hennig-Schmidt 2006). Words and phrases like "Player 1", "Transfer", "Choose X"... can be less telling than direct ones like "firm", "private payment", "grant the permission"... When subjects are framed in this context, they might feel responsive to the actual context of the game. Language can interfere as a means of justification in the experiment, however in Abbink's experiment, a Mann-Whitney U test does not reject the null hypothesis of equal permissions between treatments. This research employs full loaded language to address corruption as a direct problem (with appropriate translation to the local language where the experiment is run).

This paper differentiates itself from Gangadharan, Cameron, Chaudhuri and Erkal's (2009) paper in two main points: a fixed level of punishment and a separate treatment with public information. They report statistical significance in different means across four samples: Australia, Singapore, India and Indonesia although the rates of initiating bribery is insignificant. It also shows compelling a reduction in accepting rates when the punishment threat is credible. Punishing behavior suggests a more tolerant attitude towards corruption in India and Indonesia whereas Singaporean and Australian subjects are more likely to punish this behavior, even at their own cost. As a treatment with public information (that requires some quick calculation during the procedure of the experiment) is employed in my research, punishment is fixed at two levels (high and low) to make the experiment feasible. This treatment is an attempt to test the effect of Brunetti and Weder's (2003) hypothesis: A free press is bad news for corruption. A negative correlation between freedom of the press and levels of corruption across countries was established, "an improvement of one standard deviation in press freedom could reduce corruption between 0.4 and 0.9 points (on the scale from 0 to 6)". Another determinant of corruption to be tested is the monitoring mechanism. Serra (2011) compares the corruption behavior between top-down monitoring (where the state official's behavior is controlled by a senior official) and bottom-up monitoring (where a citizen whose profit is compromised by corrupt behavior audits this). Naturally it is predictable that the citizen will have more incentive to be rigorously responsible for governing this setting. The result is surprising that the most effective way is a combined auditing mechanism even with a lower probability of detection. This is reasoned by a non-monetary cost of a social disapproval. Again, I have become more interested in this cost as an anti-corruption factor. It is noted that gender was not controlled and tested in this experiment due to the lack of a meaningful research question. Even findings from

other researchers (Dollar, Fisman and Gatti 2001) have flaws in supporting the difference in corruption rate correlated with a gender factor.

### **3.3 Experimental Method.**

#### **3.3.1 Design**

The setting of this experiment follows Gangadharan et al.'s (2009) experiment under the Welfare-Reducing Bribe game with some modification. A sequential, three-person-game, starts with the move by the Firm. She faces a binary choice of whether to start a bribe, if she remains uninterested, her payoff is 60 points. No other players can make a move and the Official's and the Citizen's respective payoffs are 30 and 50 points. If the Firm chooses to bribe, the game depends on the move of the Official (at this stage, the Firm loses 2 points as a transaction fee regardless of the Official's choice). The Official can choose to reject the bribe and ends up with 30 points as her original endowment, the Firm therefore has 58 points and the Citizen, without making any decision, has 50 points. If the Official chooses to accept the bribe, the Citizen will make a move. She can either report the incident at her own expense or remain silent. If the Citizen does not report, she earns 22 points as a result of a negative externality from the bribe. The utility function of the Citizen is given by:

$$U(c) = 50 - 7b - p$$

where  $b$  is the amount of the bribery and  $p$  is the cost of punishing. The Firm ends up with 70 points and the Official has 42 points (in fact, a bribery of  $b$  amount increases their payoffs by a multiplier of  $3b$  as a magnifying effect of the relatively low income of the Official and the potential profit gained from corruption to the Firm). The cost imposed on the Citizen therefore must be bigger than these two added values to reproduce a negative impact of the scenario. In this experiment,  $b$  is fixed at 4 (points) and  $p$  varies by 5 or 10 depending on specific treatments.

If the Citizen chooses to report the bribery under a low punishment scheme, she ends up with 17 points, the Firm and the Official have 55 and 27 respectively. A game theory equilibrium predicts that the Citizen does not report at her own cost suggesting that the Official accepts the favor from the Firm and the Firm initiates the bribery. In the actual experiment, counter-equilibria are expected to arise due to other factors: feeling of “revenge”, doing the right thing, fear of being disclosed, fear of financial loss, etc... The four treatments help categorize and analyze the behaviors. The design is based on Gangadharan’s 2009 experiment with some modifications: the payoff amount is recalculated (60,30,50 instead of 60,30,80) to minimize the difference aversion behavior of the Firms and Officials, as 80 is by common sense greater than 60 and 30. The second feature is that instead of a rather complicated function for the Citizen with  $b$  and  $p$ , it is quite straight-forward for a simple explanation during the experiment. With two treatments involving some quick calculations, it makes more sense to fix these factors. The sacrifice of a range of choice (which yields a ratio variable for more statistical analysis) is made up with simplicity for subjects to understand and possible to do a quick calculation for the information treatments.

The experiment is a one-shot game to minimize treatment effect and prevent subjects learning the tricks to earn a greater payoff, hence making decisions not based on their true preference. A repeated game can lead to distortion of equilibria when players start to learn to negotiate by signaling. For instance, if players know they can play the game for 5 periods in the same role with the same players, the Citizen is likely to choose to report the bribe for the first 3 periods to signal a credible threat to the Firm and the Official, in the hope that they would not take part in the bribery game, thus leaving her with more payoff for the 4<sup>th</sup> and 5<sup>th</sup> period. This effect is hard to separate from the same behavior coming out of righteousness. Subjects in a one-shot game make

decisions with very little difference from the last period in a multiple period game and in keeping with the predicted equilibrium. (Sherstyuk and Nori 2013) claim that subjects' cooperation in a Prisoners' Dilemma is significantly lower under Random pay but Last Period and Cumulative pay yield no difference). The point of this set up is that even though the corrupting behavior is an equilibrium it does not guarantee that it is a fair choice for everyone in the game. This setting attempts to undermine the conditions under which the equilibrium is not realized, hence it is important that subjects behave as close to the nature of the game as possible.

### **3.3.2 Procedure**

The experiment lasted about 50 minutes for each treatment. It took 30 minutes to introduce the game, read the instruction, answer questions on the spot and distribute answer sheets, 10 minutes for each treatment without information and around 20 minutes for each treatment with public information due to some calculating and announcing of the information. All points were publicly announced as being converted into local currency at the rate of 1 point / 1000 VND and this was applied for players of all roles.

Students were recruited from College of Technologies and Economics in Trade (hereby CTET) by advertisement on campus, and their majors did not matter. After sending emails to participate, the first 100 students received a confirmation email with the date, time and place of the experiment. 372 students participated in the experiment, 7 to 10 were backups for each session in case some did not show up (These students were paid a show-up fee as promised) in 4 sessions taking place over 4 days. (The first session involved 100 students, the second 97, the third 96 and the last one recruited 95 students). After the experiment, the students signed a release form and their payoffs and received their money in 2 days after calculating and preparing all the payoffs in

the exact amounts (due to my exchange rate, it was not possible to pay them the exact amounts immediately after the experiment). Due to the size of the computer lab (to make use of the cubicles so that students did not talk to each other despite it being a paper based experiment) and logistics, it was divided into 4 sessions. Students taking part in sessions 1, 2 and 3 were also asked not to release the information to a third party. This is difficult to control, however the possibility that they remembered every step from the experiment and trained another friend how to earn greater payoff from this game is trivial.

At the beginning of the experiment, 2 graduate students arranged the seating for participants (on their seat was a random number 1,2 or 3 which later on would assign them to Firm, Official or Citizen), and distributed the instructions for the game. Subjects were given 5 minutes to read the instruction on their own, after that the instructions were read out loud by a graduate student. Then subjects could raise their hands and ask any question relating to the game. They were also encouraged to take part in some questions raised by the instructor, such as how much each of the players of the game gets if one chooses Report or Reject, for example. When the first decision making process began, subjects were asked to keep silent regardless of their role. After the first decision was made, 2 graduate students collected all the forms from everyone (so that no one knew which role the others played). This added some extra work to the logistics but it guaranteed the “blindness” of the roles amongst the players. Another assistant student and I would match players in the game together and redistribute them back to the subjects. This was repeated until the first treatment ended. Subjects could ask questions before the experiment began, which raised the risk of signaling to gain more payoff later. However, as they had never participated in any game and thus were not familiar with the structure and procedure, this step was necessary.

The second treatment was similar to the first with some additional information before each player's decision so the process was 5-10 minutes longer. The second treatment and the fourth treatment involved a quick calculation after each time a decision was made. A message had been composed and a percentage of decisions were shown from a projector. These messages were added up after each node of the game and were shown throughout the treatments.

After all sessions were run (each with 4 treatments), the results were put together in an Excel file. Their payoffs were checked and prepared for distribution to subjects 2 days after the experiment ended. Subjects came with their IDs, signed and picked up their money in an envelope. Information was promised to be kept exclusively for the purpose of this research only and no personal information was used or released. On average, subjects earned 103,000 VND (approximately 3.8 € in 2013).

### **3.3.3 Treatments**

There are 4 separate treatments in this experiment, namely Low Punishment – No Information, Low Punishment – Public Information, High Punishment – No Information and High Punishment – Public Information. These 4 treatments were designed to test the effect of punishment schemes and levels of information published about the actual procedure of the game. In other words, it is very similar to reproducing the strength of severe consequences and the effect of public media on corruption.

Treatment 1 and treatment 2 took the value of  $p=5$  in the payoff function of the Citizen, hence the punishment cost for the Citizen is 5 and applies by a multiplier of 3 on the Firm and the Official. To compare the strength of punishment, the value of  $p = 10$  is employed for treatment 3 and treatment 4 (the multiplier stays the same). Indeed, it would be interesting to have more



treatments where the punishment cost stays the same, and only the multiplier doubles but due to time and financial constraint, this experiment did not attempt to make it too complicated. Also, it is obvious that if the Citizen chooses to punish the others in this case, she is sacrificing her own payoff even more, thus it makes the result more reliable for analyzing the Citizens' behavior. Treatment 2 and treatment 4 include another step of publishing the information of the game. Before the game begins, it is publicly announced on a screen (visually accessed for all players) that information for each step will be broadcast on that screen (with no individual disclosure). After the Firm made her decision and all the forms were collected, a quick calculation of how many Firms actually decided to initiate the bribe was done. (For that reason, the choice was binary rather than a range of values). Then there were announcements on the screen as follows: "This is the second stage, the one to make a decision in this stage is the Official (on the condition that the Firm chose to bribe in the previous stage). In the last stage, there were 31 Firms participating, 28 of whom (90.3%) chose to bribe, 3 of whom (9.7%) chose not to bribe. The Official can make a decision here, depending on her/his own calculation and preference." (This message is taken from the actual experiment (treatment 2)). This is repeated one more time before the Citizen makes her choice with the information from the Officials. Two messages were cumulative and shown on the screen until the end of the experiment). It is not easy to replicate democracy in such a homogenous group, however, to an extent this reflects the ability of having a say about the process, what is happening and some counting of those who did and did not (this naturally had an effect, because if the number of those who actually did bribe was sufficiently large, it constituted a message to encourage others to follow). It is still an effort to put this information out in public to send the following message: the problem is not hidden and what one does in fact has a consequence. Despite the government's attempt to reduce corruption (applied

but not limited to Vietnam's case), in many countries it is not publicly discussed. The public press may be a powerful tool for navigating the society's norms of behavior, but if it is dedicated to "dance to one tune" in many cases it is not allowed to publish information about corruption truthfully. These treatments intend to play the role of journalists or the public press where they can have the authority to broadcast news about corruption. The subjects are expected to be affected by this information and behave accordingly. The Firms are least likely to be influenced by this information as she received no news from the game, only the fact that it will later be revealed. When information about the Firms was announced, it would mostly have an impact on the Official and the Citizens' decisions. The comparison between treatments can be analyzed from the aspect of the Official and the Citizen to reach a separate analysis of whether this treatment is more sensitive to specific roles of the players.

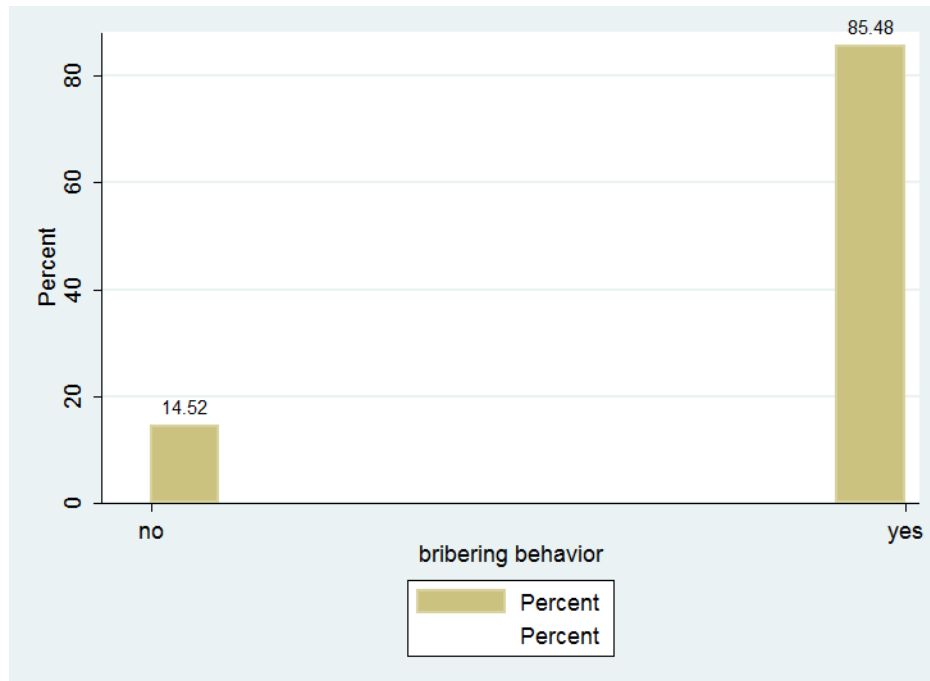
### **3.4 Results**

#### **3.4.1 Overall result**

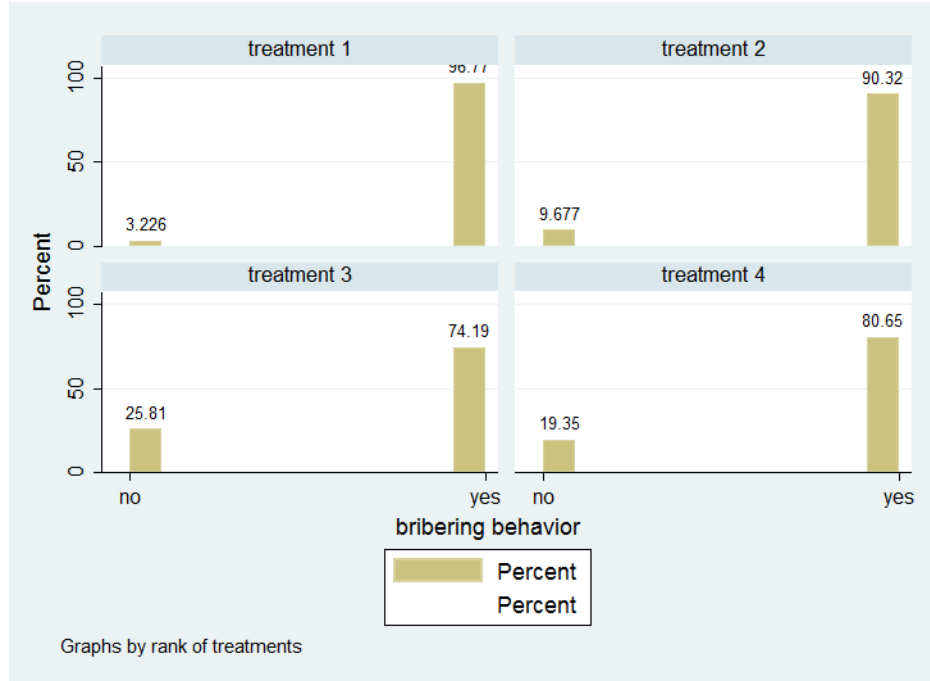
There were 388 players (372 of whom were actually playing, 16 students were backups) participating in 4 treatments and they played 124 games. Out of 124 Firms who participated and made a choice, 18 (14.52%) chose not to bribe whereas the majority of the Firms from all 4 treatments 106 subjects (84.48%) bribed. Figure 3 summarizes the percentage of the overall and each treatment's bribery rate. The choice to bribe is a dominant strategy and is greater than the other choices in all 4 treatments, although the percentages are different. Treatment 3 and treatment 4 (with a higher level of punishment) have a higher percentage of subjects who chose not to bribe (25.81% and 19.35%) compared to treatment 1 and treatment (with a lower level of punishment).

**Figure 3: Bribing behavior by percentage**

**Overall:**



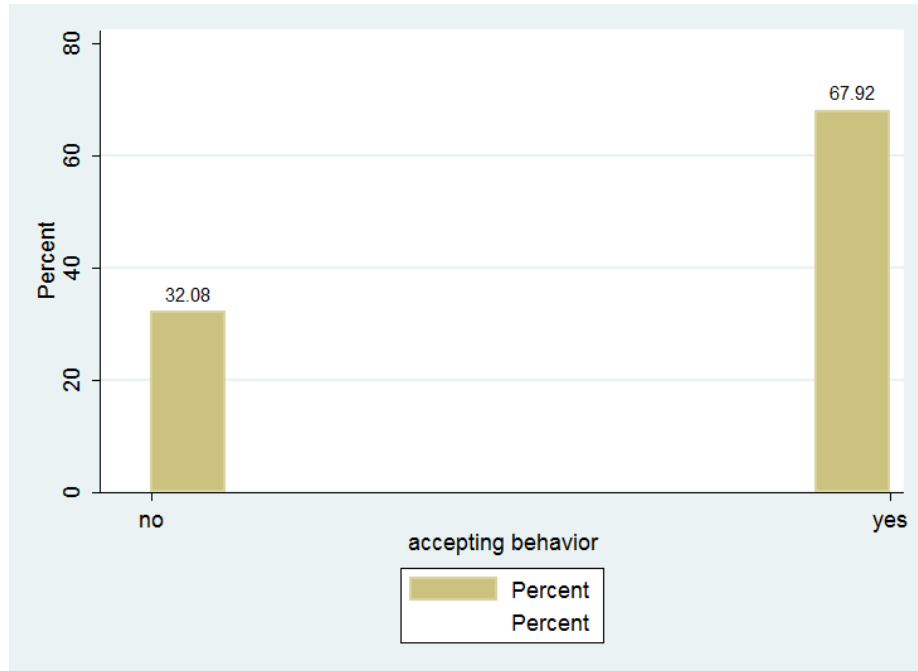
### By treatment:



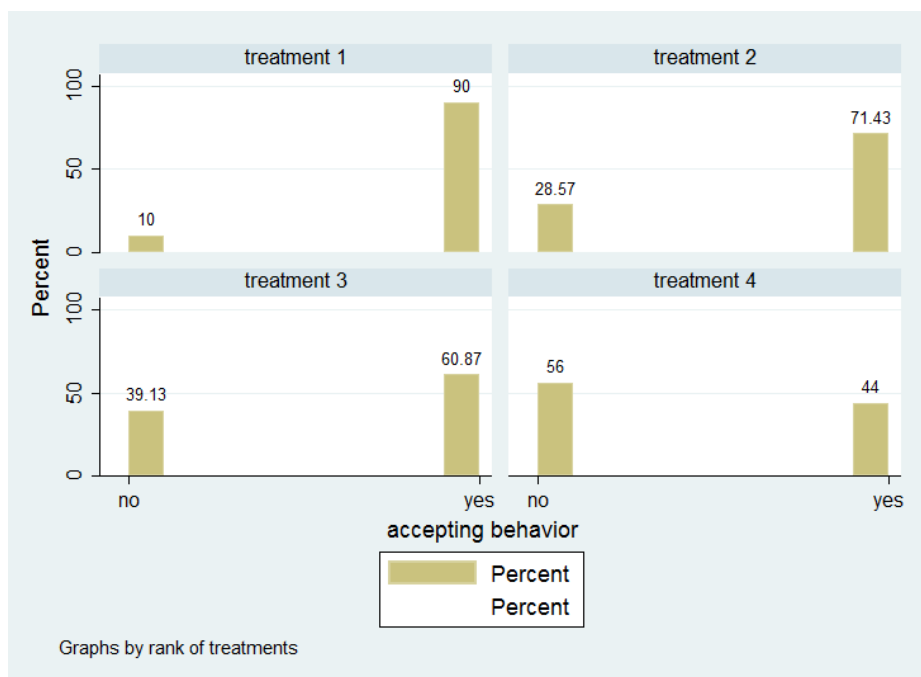
More Officials (who actually received their turn to move) chose to accept the bribe. Out of 106 Officials, 34 subjects (32.08%) rejected and 72 (67.92%) of the rest accepted the offer from the Firms. The equilibrium seemed to work in this game even with a conscience constraint. People do not care too much about rules and moral standards but usually want to maximize their payoffs in the first place, which is not too hard to understand given the assumption of rationality preference. The accepting rates by treatment show a greater contrast than the bribing scenario. Treatment 1 (without information, low punishment) had the highest rate of acceptance (90%) and this rate dropped to 71.43% in treatment 2 (public information, low punishment) and 60.87% in treatment 3 (without information, high punishment) and treatment 4 was the only treatment where the percentage of rejection outnumbered the acceptance (56% vs. 44%). (Figure 4)

**Figure 4: Accepting behavior by percentage:**

**Overall:**



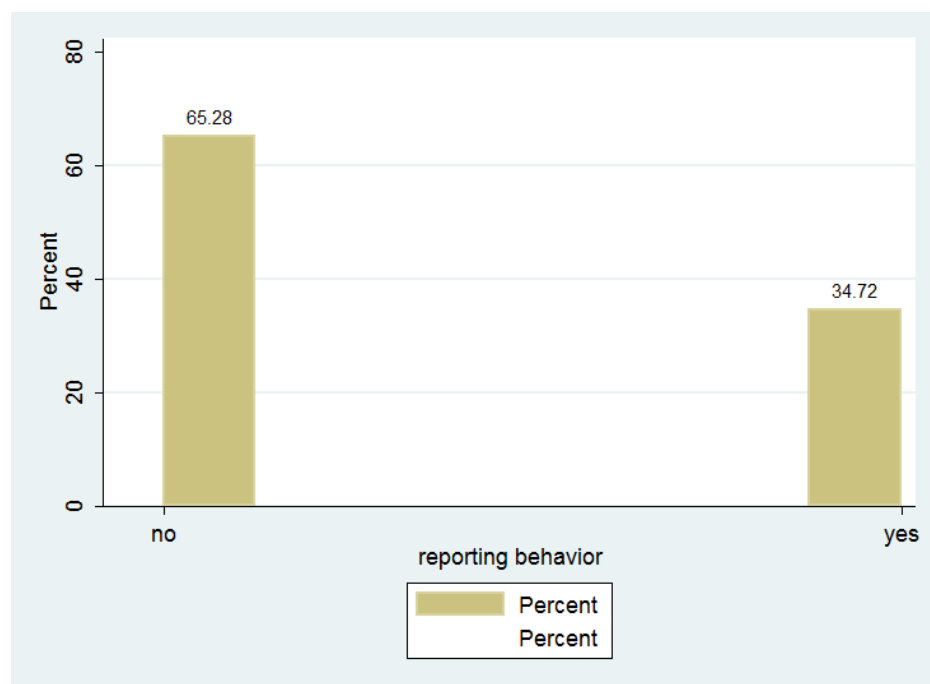
**By treatment:**



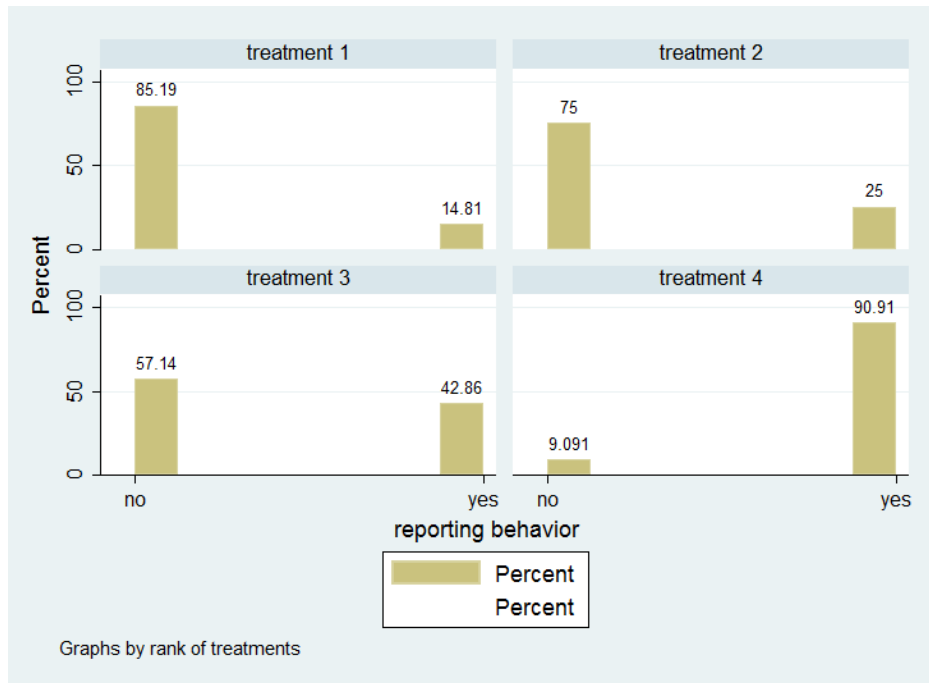
The reporting percentage is listed in Figure 5. Overall there were more Citizens choosing not to report over doing so and punishing the other two players at their own cost. 65.28% out of 72 Citizens (47) opted out while 25 Citizens (34.72%) reported the case. Treatment 1 and treatment 2 (with a lower punishment level) observed a higher ratio of non-reporting cases compared to treatment 3 and treatment 4 where the punishment level is higher. Treatment 3 almost reached a fair separation of choice (57.14% vs. 42.86%) and treatment 4 (high punishment with public information) witnessed the highest percentage of reporting the game from Citizens. 90.91% of the Citizens in treatment 4 reported and punished the other players.

**Figure 5: Reporting behavior by percentage:**

**Overall:**



### By treatment:



### 3.4.2 Punishment effect

One important hypothesis of this research is to test how strongly punishment influences the behaviors of the parties involved. This may not sound too strong, as through common sense people tend to commit to an activity less when the threat increases (in this case, it is indicated by the potential punishment imposed by the Citizen, which therefore reduces the payoff of the Firm and the Official). Cited literature shows there is a decline in the propensity to bribe and to accept when the punishment level is higher. Some argue that punishment does not always work as people are not always motivated by payoffs only, especially in societies where corruption is common.

**Table 5: Chi-squared Test on punishment effect and public information**

**Chi-squared Test on punishment effect**

Bribe	R <sup>2</sup>	p-value	Fisher's exact
Treatment 1 vs. Treatment 3	6.37	0.01**	0.01**
Treatment 2 vs. Treatment 4	1.17	0.28	0.24
Accept			
Treatment 1 vs. Treatment 3	6.31	0.01**	0.01**
Treatment 2 vs. Treatment 4	4.09	0.04*	0.04*
Report			
Treatment 1 vs. Treatment 3	3.93	0.05*	0.05*
Treatment 2 vs. Treatment 4	12.34	0.0001***	0.0001***

**Chi-squared Test on Information Effect:**

Bribe	R <sup>2</sup>	p-value	Fisher's exact
Treatment 1 vs. Treatment 3	1.07	0.30	0.30
Treatment 2 vs. Treatment 4	0.37	0.54	0.38
Accept			



Treatment 1 vs. Treatment 3	3.25	0.07*	0.07*
Treatment 2 vs. Treatment 4	1.37	0.24	0.19
Report			
Treatment 1 vs. Treatment 3	0.77	0.38	0.31
Treatment 2 vs. Treatment 4	6.17	0.01**	0.02*

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 5 summarizes the punishment effect on the behaviors of three players. High punishment in fact reduced the propensity to bribe ( $\chi^2(1) = 6.40, p < 0.012$ , p (1-sided Fisher's exact) = 0.13). This test between high and low punishment effect for no public information was significant to a 0.05 level. However, the same test between high and low punishment effect for treatment 2 and treatment 4 where public information was available was not significant ( $\chi^2(1) = 1.17, p = 0.28$ , 1-sided Fisher's exact = 0.24). This result is actually not surprising as the punishment effect is likely to be reduced when the information effect takes place.

The behavior of the Officials was also observed and tested for significance. Punishment effects between treatment 1 and treatment 3 (where public information is not available) yielded a  $\chi^2(1) = 6.31, p = 0.012$ , 1-sided Fisher's exact = 0.014). This is again significant to a 0.05 level and confirms that punishment does have an impact on Official's behavior. A test between treatment 2 and treatment 4 (where public information is available) observed a significant result to a 0.05 level ( $\chi^2(1) = 4.09, p = 0.04$ , 1-sided Fisher's exact = 0.04).

Punishment effect on reporting corruption comes from analyzing the Citizens' behavior. This test on treatment 1 and treatment 3 (without public information) was found to be significant at a 0.05 level ( $\chi^2(1)=3.93$ ,  $p=0.047$ , 1-sided Fisher's exact = 0.057) while the comparison between treatment 2 and treatment 4 (with public information) yielded a more significant level ( $\chi^2(1)=12.34$ ,  $p<0.0001$ , 1-sided Fisher's exact = 0.001).

It can be concluded from these results that a punishment scheme does have a significant effect on the behavior of all players: the Firms, the Officials and the Citizens. Overall, fewer Firms bribe, fewer Officials accept the bribe and more Citizens punish when punishment is higher. One interesting observation is that the p-value of the tests from treatment 2 and treatment 4 (where public information is introduced) was lower than that of the same test from treatment 1 and treatment 3 (with no public information), except for the behavior of the Citizens. (p-value of the test between treatment 2 and 4 is 0.001, which outperforms 0.057 in terms of statistical significance). One explanation is that the information itself creates extremes in equilibrium, like a “saddle point” situation. This means that when the information is revealed, subjects observed the trend and went with the crowd. If the number of cases participating in the previous stage of the game is sufficiently large, it would affect subjects' decisions in the next stage. In a way it is acceptable to justify their behavior as in countries where people do not usually abide by the law, as the behavior of the crowd becomes the social norm. Comparing the information published in treatment 2 and treatment 4: 90.03% of the Firms chose to bribe (treatment 2) and 80.64% (treatment 4) of the Firms chose to bribe affected the next stage where the Officials made the decision. Analyzing this information, 71.43% of the Officials chose to accept in treatment 2 and 44% of the Officials accepted the bribe (treatment 4). This led to a big change in the Citizens'

reaction: 90.90% of the Citizens in treatment 4 reported and punished the other two while only 25% of the Citizens in treatment 2 chose to do the same thing.

A sequence of probit regression was run to test the validity and significance of the Fisher's exact tests. Table 6 summarizes the significance levels of 2 effects on different conditional probabilities. Under the low punishment scheme, bribe probability became less likely but the  $p$ -value was not significant ( $p=0.31$ ). Information effect did not seem to have an impact under the high punishment treatment either where the  $p$ -value for the similar test is 0.54. This is in line with Fisher's test when Firms do not react to the information.

**Table 6: Probit regression on public information effect and punishment effect**

**Panel A: Probit regression on public information effect**

Bribe probability	Coefficient	z-statistics	p-value	R <sup>2</sup>
Treatment 1 vs. Treatment 3	-0.55	-1.02	0.31	0.02
Treatment 2 vs. Treatment 4	0.22	0.61	0.54	0.01
Accept probability				
Treatment 1 vs. Treatment 3	-0.72	-1.79	0.07	0.01
Treatment 2 vs. Treatment 4	-0.42	-1.17	0.24	0.03
Report Probability				
Treatment 1 vs. Treatment 3	0.37	0.87	0.38	0.02

Treatment 2 vs. Treatment 4	1.51	2.43	0.01**	0.03
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**Panel B: Probit regression on punishment effect**

Bribe probability	Coefficient	z-statistics	p-value	R <sup>2</sup>
Treatment 1 vs. Treatment 3	-1.20	-2.39	0.02*	0.01
Treatment 2 vs. Treatment 4	-0.44	-1.08	0.28	0.03
Accept probability				
Treatment 1 vs. Treatment 3	-1.00	-2.46	0.01**	0.05
Treatment 2 vs. Treatment 4	-0.72	-2.02	0.04*	0.02
Report Probability				
Treatment 1 vs. Treatment 3	0.86	1.93	0.05*	0.03
Treatment 2 vs. Treatment 4	2.00	3.29	0.001**	0.11

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The punishment effect looks more significant in changing the probabilities of outcomes. The bribe probability is less likely between treatment 1 and treatment 3 (with no information) ( $p=0.017$ ) but not treatment 2 and treatment 4 (with public information) ( $p=0.28$ ). Punishment effect is more significant on reporting behavior, so the probability changes are more reliable with the regression on Official's behavior. High punishment reduces the probability of accepting a

bribe from treatment 1 to treatment 3 ( $p=0.01$ ); from treatment 2 to treatment 4 ( $p=0.04$ ). Margins in both tests are significant to a 0.001 level.

The probability of reporting the bribery increases from treatment 1 to treatment 3 (with no information) with a p-value of 0.05 and from treatment 2 to treatment 4 (with public information) with a p-value of 0.001. These results confirm the validity of Fisher's tests and predict a significant change in the outcomes for some tests.

### **3.4.3 Information effect**

Compared to the punishment effect, the public information had a less significant impact on subjects' behavior. At the beginning of this experiment, this effect was expected to support a hypothesis that public information helps reduce corruption. However, the statistical analysis leads to a different interpretation. Table 2 reports the effects of public information of bribing, accepting and reporting behaviors. First, the bribing behavior from the Firms did not present strong statistical proof. 30 cases chose to bribe compared to 28 subjects between treatment 1 and treatment 2 (out of 31 for each treatment) only yielded a  $\chi^2(1) = 1.07$  with a p-value = 0.30, 1-sided Fisher's exact = 0.306. The difference between treatment 3 and treatment 4 (with high punishment level) also failed to reject the null hypothesis ( $\chi^2(1)=0.37$ , p-value=0.54, 1-sided Fisher's exact = 0.38). In both cases, bribing behavior did not seem to be affected with the introduction of public information, and p-values confirmed that it could be likely to happen by chance.

Secondly, a Fisher's exact test with the Officials' behavior tested the public information effect on the accepting behavior. The result was weakly significant between treatment 1 and treatment 2 (low punishment level) with a  $\chi^2(1)= 3.25$ , p-value=0.07, 1-sided Fisher's exact = 0.07). 14/23 of

the Officials in treatment 3 accept compared with 11/25 of the Officials in treatment 4 (both employ high punishment levels) reports a  $\chi^2(1)=1.36$ ,  $p\text{-value}=0.24$ , 1-sided Fisher's exact = 0.19 and this is not significant. An explanation for this result was that, the punishment effect outperformed the public information effect in treatment 3 and treatment 4, which made it less significant than treatment 1 and treatment 2. However, this effect was statistically weak in both cases.

Finally, the reporting behavior of the Citizens between treatment 1 and treatment 2 was not significant, ( $\chi^2(1)=0.77$ ,  $p\text{-value}=0.38$ , 1-sided Fisher's exact=0.30) whereas the similar test between treatment 3 and treatment 4 produced a  $\chi^2(1)=6.17$ ,  $p\text{-value}=0.013$ , 1-sided Fisher's exact=0.017. This may be a little confusing but the explanation with the “saddle point” equilibrium seemed appropriate to justify this difference.

The information effect has almost no significant impact on the Officials' behavior when the probability of accepting the bribery is weak and less likely under the low punishment scheme ( $p=0.07$ ) and not significant between treatment 3 and treatment 4 ( $p\text{-value}=0.24$ ). The weak significant result between treatment 1 and treatment 2 is dominated by the punishment effect between treatment 3 and treatment 4.

The probability of reporting from the Citizens is not significant between treatment 1 and treatment 2 (low punishment scheme) and significant to a 0.05 level between treatment 3 and treatment 4 ( $p=0.016$ ). This argues with Fisher's test and can be explained by the “saddle point” equilibrium. The margins between treatment 3 and treatment 4 changing the probability of reporting is significant ( $p<0.001$ ).

From Table 6's probit regression, the result of information effect appeared to be insignificant, and yet it is important to conclude the following: public information does not work in some cases. This does not fully agree with existing literature in macroeconomics where it is confirmed that democracy (including public information) has a strong negative impact on corruption. This is true for a large and diverse sample of countries, many of which are at a high level of democracy. However, we may think of it this way, when a society has not reached a point of development, then social information is a kind of luxury good that people cannot afford yet. So even when it is available people do not "consume" this good immediately and it takes time for the people to appreciate the benefit of it. People can be skeptical about the information provided because they are not used to it, hence do not trust the validity of this information and fail to leverage the value of it. Only when they observe a large percentage of the crowd doing something do they start to join in and behave accordingly.

### **3.4 Discussion**

The first result shows that punishment is effective as a tool against corruption in this sample. This is not too surprising and in line with existing literature from Cameron, Lisa, Abbink, Hennig-Schmidt and some other authors. However, it is quite important to note that in the similar experiment in India and Indonesia, it was concluded that punishment plays an important part in reducing corruption. This implies that in countries where corruption is accepted or the government performs badly on the chart of corruption cleanliness, people are quite sensitive to punishment and reduce their corruption behavior or become more active in sanctioning this "illegal contract" even at their own cost.

The context of making public information available about the actual bribery itself does not meet the expectation of the author when designing the experiment. Most coefficients are negative (this

implies that this effect has some influence over people's behavior) but not to a strong level of significance. One reason behind this could be that people who are not so familiar with democratic information do not appreciate it as a source and neglect this tool as a signal that corruption is being monitored. They would pay more attention if the information specifies individuals or reveals identities, but is not collectively announced or as an abstract number. Another explanation is that when the number of corrupt cases exceeds a certain number that is sufficiently high, it converges to an even higher number. Conversely, if the numbers of the cases reported are sufficiently small, it can lead to a shrinking of equilibrium. In other words, people observe this and "go with the crowd" without considering if their behavior is moral or ethical. Future work can analyze this idea in a different sample where the starting point is the same, but the statistics in the information treatment change to see if this converges to a shrinking number of cases in the next round or an increasing number of cases being reported in the last period. The result of the public information treatments deviated from the original expected hypothesis. However, it is valuable to conclude that giving out information on corruption as a collective message has a very blurred effect on changing people's behavior. In some other research, when subjects are revealed with their name or face-to-face communication, the offer in the Ultimatum Game or Dictator's Game tend to reach a fair decision. In this case, the social distance is still strong enough to secure people's anonymity and thus does not create a strong effect on subjects' decision-making processes. An insignificant result in this case indeed carries important messages. In some other macro models, democracy and public press "is bad news for corruption" and their coefficients are significant. This research shows that it does not necessarily work. This is important because it means that it does not work in all societies, but probably only in ones where democracy is available and people have a right to talk about it. So when they observe this



message as “signaling”, their behavior will change accordingly. In other societies where democracy or people are skeptical about public information, it does not always guarantee a positive feedback. They may skip the information even though it is true, or expect things to change by default, but do not take action to make changes. Another important finding in this research is that, in the public information treatment, the bribery rate started to go down more quickly whereas the accepting rate and reporting rate remained indifferent after the message was broadcast. This suggests that Firms, after noticing that the other players can be sensitive to the message consider deviating from the equilibrium (in this case, not a Pareto one). However, after the first round, the Officials observed the message and saw a relatively large number of Firms actually decided to bribe. This justified her behavior and changed her decision marginally the Citizens’ behavior. The moral of the story is that behavior (good and bad) can have a snowball effect, if more people are doing the good things and sanctioning the free-riders or opportunists, people behave themselves better and take part in the process. On the contrary, a small collection of bad behavior can have irreversible future consequences and lead to a group of opportunistic behaviors.

Should societies with a lower level of trustworthy public information give up on this? The answer is no. In fact, people should be given more trustworthy information about the actual facts and learn to appreciate this information from the government, hence they can start to base their decisions upon it and build up trust. Governments in these countries should be more open to their people about information that reflects the actual situation of their country rather than keeping this information to themselves. This includes the monopolistic broadcasting of the news, capturing free-bloggers for speaking out and other methods of suppressing information that is not in tune with the government’s point of view. The more detailed information people have access to, the

more social discussion is developed and helps formalize a well-informed society. People will be more sensitive to information and stand up to do the right thing more often than just to follow the crowd.

Although the information treatment does not give a sharp and resolute result that public information ends corruption, it is undeniable that together with a punishment policy, it plays an important role in addressing this issue. This provides more evidence for international organizations like Transparency International and Amnesty International in negotiating freedom for arrested parties in countries where freedom of speech is limited.

## **Chapter 4: “That we are in the same boat matters less than which boat we are in” – the impact of social distance on group effect and division effect.**

A number of experimental studies suggest that in-group favoritism by default usually comes with out-group discrimination. This chapter challenges this assumption by studying the impact of social distance on group effect and focusing on methods which utilize dividing into groups before they interact with each other. The results prove that subjects do not behave in the same way towards their in-group and out-group members but instead develop mixed and complicated preference against common sense. As long as subjects enjoy their group status, a simple intuition of group effects is applicable. However, when being part of the group is not an advantage to the subjects they do not exhibit a preference for in-group favoritism and even display out-group favoritism as part of an attempt to change their group status.

### **4.1 Introduction**

In “That's Beijing” (September 2012) – a monthly magazine for expatriates, a protestor wearing a Guy Fawkes mask received a small column to express his opinion against unfair admission policies of universities in Beijing. The issue was that, Beijing-based universities offer Beijing students a lower score as a criteria for the entrance exam as opposed to non-Beijingers. As large as China is, there is discrimination amongst different groups of people. Naturally these groups are formed in many possible ways but the most noticeable formation of groups are based on geographical origins and economic status. There has been an increasing amount of literature on group effects. Because the world is getting smaller, people can travel far from their hometown to settle down, form their own community and exhibit differences, which leads to group formation.

Their interaction with other groups can trigger possible social failures. Traditionally it is believed that people show favoritism towards their in-group members and at the same time, exhibit a greater degree of envy and less sympathy for their out-group matches. However, this is not always the case in experimental economics.

In fact, empirical data from experiments have confirmed that people do not always behave as such theories predict. Dictators in the dictator's game do not take all, prisoners in prisoners' dilemma do not always defect and positive amounts are sent in both ways in the trust game. Behavioral scientists are interested in the factors that interfere with the decision-making processes, which offers the hope that many social mechanisms can reach better or more socially constructive outcomes.

One range of interest that involves economists like M. Rabin (1999), G. Charness (2005), Y. Chen and X. Li (2009), R. Croson (2013) is identifying the determinants of preference. A number of them have been successful and persuasive in analyzing the potential and influence of group effects in connection with social preference. Since 1993, M. Rabin has published papers which estimate the likelihood of envy and guilt and use these to explain the applications of different preference models. A turning point as part of this bigger picture was the collaboration in 2009 of Y. Chen and X. Li, who incorporated psychological framing into preference analysis. In the resulting paper, people are shown to exhibit strong in-group favoritism and out-group discrimination regardless of how their group is formed. It could be argued that this favoritism comes from the “shadow of the future” as stated by Dal Bo (2005), who initiated this idea. This was proven due to a higher percentage of cooperation between prisoners in the prisoners' dilemma game as the probability of continuation increased. Other researchers (G. Charness 2008, R. Croson 2006) have found that self-exposure leads to a fair split in the dictator's game

compared to the control treatment, where anonymity is guaranteed. One conjecture is that, in-group favoritism comes from the unconscious part of the mind. Subjects are misguided by naïve statistics and believe in future regrouping given their initial grouping. Another reasonable explanation may be that people with similar abilities, interests, race or geographical background are more likely to interact with one another than those who do not share these features. This yields some advantages towards in-group members. However, in-group favoritism is evident in experimental economics. People tend to allocate more resources to in-group members in the Other-Other game and exhibit less envy or more charity to “their people”. But is this always the case? Some other researchers find mixed behaviors as, for instance, Camerer et al. (2010) observe out-group favoritism from a more advantaged group to a lesser one. This raises some interesting questions: what associates people with in-group favoritism? If the group they belong to gives them a sense of inferiority in social contexts, will the in-group favoritism still exist? Do people in turn give a “hand-out” to out-group members to mentally join a new group and abandon their old groups that they no longer necessarily want to feel attached to? Another contrary behavior could be that, being in an inferior group enhances in-group favoritism as a defense mechanism against the more advantaged group. This becomes more complicated when one of the members misbehaves. The degree to which another member forgives this behavior or it actually becomes part of the profile of others as a strategy for this given group, can lead to a harsher punishment for the misbehaving member and a distrust of the other members of the group.

This paper aims to employ some forms of grouping and information to observe and report trends of behavior across group members. Individual identification is determined by establishing the geographical and economic status as a base of information for subjects to include or exclude

themselves. This framing expects people to exhibit complex preferences which will hopefully later be revealed in the model. Why do social scientists care about social discrimination or favoritism? Without passing judgment on the Beijing universities in particular, learning about separating people can help us prevent possible but wasteful social upheaval and turmoil. In work places, we generally want to create a healthy and fair environment without personal coalitions or the polarization of human resources. Social productivity should not be compromised by unnecessary discrimination.

First impressions reveal some features about a person. One's accent suggests their first and given identity (naturally not for everyone. Some people can speak a foreign language perfectly with no accent but this is not so generally. This is also not restricted to a second language, even when the language is one's mother tongue, as a person is likely to speak it with a local accent anyway, i.e. New York English, Scottish English, high German, Austrian German). People may derive some expectations from this information. The second image a person carries with them is how much money they have, which is shown through one's clothes, accessories and lifestyle (this speaks volumes and many researchers have shown interests in the connection between brand-showing behavior and other factors).

In this chapter, I attempt to put these two layers together in an experiment that exhibits envy, charity, personal maximization and costly revenge when people interact with each other given their geographical and economic backgrounds. The hypotheses I am interested in include: which information dominates the other, whether being in a less advantaged group makes people more harmonious or do they turn their back on each other? The chapter is developed as follows: section 2 discusses relevant cited literature and contributions; section 3 illustrates the design of the experiment; and section 4 analyzes the data and discussion.

## 4.2 Literature review

This paper serves as part of a large project involving a number of researchers who are interested in social preference and group identity. This section offers a summary of relevant existing literature so as to formulate arguments and predictions on the hypotheses being put forward. Some papers have contradictory or mixed results but it is expected that an explanation will be found as well as a means of implementing these findings into my experiment.

Group identity and consequent behaviors have caught the interest of a number of researchers. They have used different approaches to divide groups to analyze the effect of each method, i.e. random groups vs. paintings from different artists (Chen and Li 2009), given by authority (*hokou* in China (Li and Ren 2013), ethnic groups (Camerer, Tanaka and Nguyen 2010, Burns 2006). But how much do people care about others' when they are put together and begin to compare themselves? Charness and Rabin (2001, 2005), Fehr and Schmidt (1999), Bolton and Ockenfels (2000) employ different models to identify people's preference in relation with another and how each element (envy, charity, reciprocity, self-interest) is exhibited in different games. An influential paper that prompts a lot of subsequent research about social preference is by Charness and Rabin (2001), who initiate a model that explains and fits the collected data in different contexts: social-welfare preference, inequality aversion, competitive and narrow self-interest. Social-welfare preferences substantially outperforms other models in explaining behaviors through a series of games. Fehr and Schmidt (1999) underline the importance of inequity aversion using empirical results from “fair” and “cooperative” behaviors instead of theory-predicted “unfair” and “non-cooperative” ones. One of their fundamental insights is that it is caused by the interaction between distribution of preferences and its corresponding strategic environment. This means that it is more complicated to capture one's preference as people tend to

behave themselves contingent on their belief in the group they are with. Bolton and Ockenfels (2000) prove this with data from ultimatum and dictator's games with the ERC model (equity, reciprocity and competition). While Fehr and Schmidt point to equity, Dufwenberg and Kirschsteiger (2004) are more in favor of reciprocity as the key factor for social preference and an outperformed tool in analyzing behaviors.

Ultimately there is no model that fits all behaviors 100%, especially as human behavior is more complicated than being plain black and white and also dependent on their beliefs. But beliefs can be shaped. When it comes to a group of people, the belief about what to expect and the belief in how one relates oneself to a particular group can change behavior. Croson, Li (2013) target low income Hispanic immigrants in an experiment and find a positive effect of identity and a negative one of social exclusion on the provision of public goods. The study is valuable in terms of measuring the group effect rather than a manipulated one, hence it introduces an observational aspect with an experimental approach. Low income people show accented group effects in enhancing their group identity through neighborhood activities. As interesting as this is, some questions do arise, i.e. how these behaviors hold when they interact with white people who are framed as a higher income group. Once a difference occurs, people receive this information and start to jump to a particular conclusion relatively quickly – which is what Munro and Ditto (1997) define as polarization. People become polarized even by mixed information in an other-other experiment. Confirming this theory, Fryer, Harms and Jackson (2013) stress the importance of the initial posterior that is constantly updated by analyzing signals and which makes people's opinion converge to either one state or the opposite rather than staying neutral. Humans' propensity is to over-interpret evidence that reinforce their beliefs while disregarding contradictory information in an other-other experiment. In this experiment, the idea is to signal



information about difference in terms of economic and geographical background to test this polarization. In other words, when people are framed, their preferences and choices may differ – this is tested in Dufwenberg, Gaechter and Hennig-Schmidt (2011). By framing subjects with the use of language, it turns out that their first-order beliefs vary across treatments, i.e. subjects give significantly more when they are told that they are in the *give-some* game as compared to the *take-some* game. This also affects their second-order beliefs, which are lower in the *give-some* than the *take-some* game. Naturally the actual contribution to the common pool is correlated with these beliefs and yields a significant result. It can also be considered in relation to the case of polarization in the public vs. private identity. Stated simply, their experiment proves that people can really be affected by information about what to expect from the other. Furthermore, when someone reveals information about their background, the other can use this as a proxy to anticipate how they will behave. Sometimes this stereotype creates unfair and discriminatory attitudes towards certain groups of people and force them to fit such a stereotype regardless of their initial posterior.

Chen and Li (2009) employ the idea of social preference from Rabin and Charness (2001) and frame people with their group identity. Subjects show strong in-group favoritism as well as out-group discrimination regardless of how the groups are formed (either by arbitrary categorical separation or with a process involving learning about paintings). They also exhibit less envy and more charity for an in-group match and are more likely to reward good behaviors but more forgiving of an in-group member in the event of misbehavior. However, this is not always the result derived from in-group behaviors. When 3 groups of Vietnamese ethnics (2 minority and 1 majority) are mixed and interact with one another, the poor minority group show strong in-group favoritism in Camerer, Nguyen (2010). Interestingly, one minority group (the Chinese) and the

majority group (the Viet) do not seem to discriminate against the poor minority group (the Khmer). It turns out that the two fairly rich groups are willing to give the poor one a hand-out but not a handshake. Offering more to the Khmer is considered a “taste” in this game in which it gives the other two groups a relatively noble feeling having helped out the less advantaged one.

These mixed findings are also confirmed in the literature on psychology; Duckitt and Mphuthing (1998) find a strong relation between in-group identification and out-group negativity contingent on their status. Black Africans show out-group hate towards other black Africans in South Africa but the results are not so much significant in supporting the same hypothesis amongst the English whites. This is the case where group status reserves in-group favoritism. As people are socially active, one can identify oneself as a member of many groups at the same time and not necessarily find these groups mutually exclusive. (Brewer and Silver 1997). In fact, they find no correlation across identity variables: ethnicity, religion, gender, political groundings. Some others suggest that in-group love does not always invoke out-group hate, for instance, Mummendey et al. (1992) suggest a theory of separation between in-groupers and out-groupers but it is less likely to impose negative outcomes on out-group members. This is also what Charness and Rabin (2001) find in one of their games in which a person faces two choices that yields themselves the same payoff but the other one yields a great difference. If out-group hate is negligible, the outcome of choices should be at least indifferent. The Berk30 game in their research in fact shows an outcome towards social welfare preference, which means most people tend to help the other without any group effect. By using the distributional preference, they conclude that social welfare preference outperforms other models as an attempt to capture people's preference (while the importance of reciprocity is also confirmed).

From a summary of the literature, one can start questioning whether in-group favoritism and out-group discrimination co-exist and under which circumstances they prove themselves to be dominant. The mixed findings here suggest there are layers of group effect that subtly interfere with people's preferences, a finding which brings this paper to the following conjectures.

*Conjecture 1: Group effect (including in-group favoritism and out-group discrimination) exists but the intensity of this effect does not equally hold.* One of the grouping methods may show stronger results.

Chen, Li (2009) categorize subjects in different groups using a random process and other sets of treatments using paintings from Kandinsky and Klee. Either way in-group favoritism is demonstrated. All the grouping methods in their research put subjects in different groups but these groups do not tend to be compared to each other. A more real-life approach is to enhance the group effect by creating groups with some additional information in such a way that subjects in these groups have two notions in mind: one is the group separation itself, the other is how this group is in comparison with the other group. It is expected that by grouping people and giving them this idea of being in the more (or less) advantaged group, behaviors will change and preferences will not be identically distributed across treatments. This may shed light on the mixed findings from Camerer, Tanaka and Nguyen (2010) and help us better understand different behaviors from the Viet and Chinese ethnic groups towards the Khmer one. There is a strong difference between 30 groups when they distinguish between positive in-group regard and social distance towards out-groupers (Brewer and Campbell 1976).

*Conjecture 2: Group effect, especially in-group favoritism, depends on the status of the group.*

This is in accordance with Afridi, Li and Ren's (2013) paper in which they find that people's performance decreases as their group status is made salient. Camerer, Tanaka and Nguyen (2010) look at helping out the less advantaged one as a “taste” in this game, which suggests that more advantaged groups can exhibit a taste of helping out the out-group members when it nurtures a feeling of being in a more advantaged group. On the contrary, this research focuses on group status and their behavior among their own members and out-group ones to further discuss the theory of separation and group status. If there is an absence in the sentiments towards some certain groups, they will tend to be less likely to be helped (Dovidio and Gaertner 1993, Pettigrew and Meertens 1995, Stangor, Sullivan and Ford 1991). This is what Brewer (1999a) defines as “moral superiority” that after dividing groups, people tend to use to evaluate *their own group* as superior (“more peaceful, trustworthy, friendly and honest”) compared to others. Brewer (1999b) is also aware of the perceived threat that can negatively affect in-group favoritism, thus this conjecture is supported by an empirical and theoretical background.

### **4.3 Experimental Design**

#### **4.3.1 *The game and identity separation***

The purpose is to find out distinguish between the dominant preferences caused by methods of separation that will affect the decision-making processes. There will be two main pieces of information that subjects know about the other player in the game: their geographical background and their economic background.

The game that is used in this experiment is taken from a series of games in Rabin and Charness (2001) paper to differentiate between social preferences (Berk31). It is a 2-person sequential game that starts with player A, who faces two choices: opt out and receive 400 tokens while

player B gets 1200 tokens without any further move and the game ends. Player A can also choose to enter and player B will make her move on that condition. She also faces a binary choice of either going left and receives 200 tokens where A's payoff is the same amount if A chooses to opt out (400 tokens); or B can go right and they both receive 0 tokens (0,0). By backward induction, there are 2 equilibria in this game where A chooses to opt out (hence the payoff is (400,1200) for A and B respectively) or B chooses to go left and they end up at (400,200).

Players	B	Left	Right
A			
Opt out		<b>(400,1200)</b>	<b>(400,1200)</b>
Go in		<b>(400, 200)</b>	(0, 0)

Player A is indifferent to the two equilibria in this game as she receives the same amount of tokens but player B's payoff can change a lot, hence it is up to player A's taste to decide which equilibrium is dominant. It reveals player A's social preference towards whether, she chooses to opt out, she cares more about social-welfare and less about being far behind player B (this does not fit some of the difference aversion i.e. Fehr and Schmidt 1999). However, if player A chooses to go in, she exhibits more envy towards B and doesn't want B to perform better than her even when her payoff remains the same.

Player B's choice, on the other hand, is an answer to player A's non-cooperative behavior (as B only gets to move on the condition that A chooses to go in). Player B can adopt a position of pure payoff-maximization and only care about her own payoff and forget player A's unfriendly behavior and hence go with the option of going left and receive 200 tokens. It is slightly pitiful

that player B's choice of going left cannot be separating from her own payoff concern or forgiving A. However, if B chooses to go right, it is quite obvious that she sacrifices her own payoff to punish player A. (See Appendix 5 for the extensive form of the game).

Based on this game and the subjects' choices, analyses can help distinguish parameters of charity, envy, revenge and payoff-maximizing. More interestingly, how information about being in the same group affects these choices can answer more questions about group identity and social preference. To illustrate a real life situation, I choose to mimic the two most prominent identities that people tend to display at the first impression: economic background (being rich or poor) or geographical background (being related to one specific city).

To create a rich and poor group effect, another subgame is played prior to the main other-regarding game. Players are asked to take part in the classic paper-scissors-stone game by making three independent choices (paper, scissors or stone) and later on will be matched with another random player. The one who wins two (or three) times will receive another 200 tokens and be categorized in the Rich group. The ones who lose this game therefore form a Poor group and do not get any extra tokens. In the case of three draws, the experimenter will arbitrarily assign a winner, however the odds are so low that it did not happen in the actual experiment. However, subjects are aware of this situation from the instructions.

The second group effect that is employed is their geographical background. As China is diverse in ethnic groups and provinces, it does not make sense to use all groups or provinces. Another reason is that, if many groups are listed, it gives more white noise to later data analysis as one cannot interpret a behavior of one certain group to two or three other groups as each of them perceive the group identity differently. For instance, one may argue that a person from Beijing

feels more related and gives a favor to someone from Shanghai because they are in the top cities in China in terms of economic growth and international reputation. However, Beijing and Shanghai are also rivals for being the better city on the list, thus when a Beijing person (denoted as player  $i$ ) chooses to go in given the information that the other play is from Shanghai, she also makes the same choice towards someone else from Fuxin (a relatively small city). Data analysis will face a problem with another Beijing person (player  $j$ ) who opts out for a Shanghai partner but go in for someone from Laiwu (another small city).

To simplify the design, it is divided into two groups: Beijing and non-Beijing. One criticism is that, non-Beijing is big and it does not seem to create an in-group favoritism because one person does not know if the other comes from her province or actually from a province she does not attach positive feelings to. Given that the experiment is run in Beijing where Beijingers are enjoying home advantage and the other group is named “Beijing”, the “non-Beijing” group is expected to behave as predicted. It is closer to a real-life situation than a created domain so the result can be regarded as an observational study. In the past, China used a strict *hokou* (registered address) to keep track of the people. Without an appropriate *hokou*, people could not get a job or buy properties and this system created discriminatory attitudes against people coming to bigger cities.

The design focuses on the following features: identity (two ways of separation), charity, envy, payoff-maximizing, exposing a preference for revenge revealing. It is expected that different behaviors will be seen when information about identity is given.

### **4.3.2 Procedure**

The experiment was carried out in Renmin University from September of 2012 until mid January of 2013. Participants were recruited via flyers distributed and advertised on campus. By design, selection bias is required and participants were asked about their registered address (*hokou*) in their sign-up email. The recruitment took almost two months to collect participants with suitable backgrounds and they were notified via emails about an appointment to participate in a session, all of which took place between 10:00 and 16:00 during the weeks. Each session lasted around two hours and a decision was made at random for which game they would be paid. A cumulative payment scheme does not differentiate itself from a random payment scheme, (Croson, Li 2013, Friedman, Sunder 1994), hence it is a widely received practice to pay subjects based on one or a couple of randomly chosen rounds. Participants were aware of this information. 73% of participants who confirmed their participation showed up and earned 92 RMB (11.35 euros) on average. Payment was a sum of first game (Paper-scissors-stone) and the second game. As it was an on-campus experiment, the age difference is negligible. Subjects did not know their partner's face, name or gender so these factors were not controlled.

### **4.4 Results**

Data analysis helps to clarify the following hypotheses: in-group favoritism exists; effects causing in-group favoritism are distinguished as is their estimated contribution to preference.

*Result 1: in-group favoritism shows its effects on the percentages of subjects who choose a social-welfare preference toward an in-group member.*



**Table 7: Tabulation of choices**

Panel A: player A's behavior towards player B's %: <i>percentage of players who made a SWP choice</i>					
Abj to Bbj	71.88%	$n=32$	Abj to Bnonbj	34.38%	$n=32$
Anonbj to Bnonbj	44.12%	$n=34$	Anonbj to Bbj	41.17%	$n=34$
Arich to Brich	80.00%	$n=30$	Arich to Bpoor	40.00%	$n=30$
Apoor to Bpoor	23.33%	$n=30$	Apoor to Brich	30.00%	$n=30$

Panel B: player B's behavior towards player A's %: <i>percentage of players who made a profit-maximizing choice</i>					
Bbj to Abj	68.75%	$n=32$	Bnonbj to Abj	68.75%	$n=32$
Bnonbj to Anonbj	20.59%	$n=34$	Bbj to Anonbj	73.53%	$n=34$
Brich to Arich	80.00%	$n=30$	Brich to Apoor	30.00%	$n=30$
Bpoor to Apoor	40.00%	$n=30$	Bpoor to Arich	73.33%	$n=30$

The action of going left yields player A the same level of payoff but gives player B three times as much as player A and six times more than player B in the other equilibrium. Table 1 summarizes the percentages of choices and table 2 provides statistic tests of in-group matches. In-group favoritism exhibits its effect but gives a mixed message. The in-group choices between Beijing-subjects compared to the non-Beijing ones demonstrate strong in-group favoritism (71.88% of player As choose a social-welfare preference (SWP) choice toward player Bs compared to 34.38%, ( $\chi^2(1, n=32)=9, p=0.004$ ). However, the non-Beijing subjects show no significant discrimination between in-group and out-group members when making their choice (44.12% vs. 41.18%, ( $\chi^2(1, n=34)=0.05, p=0.99$ ). A similar pattern of behavior is observed between the Rich and the Poor players. Rich player As exhibit less envy and tend to go left in favor of rich player

Bs' payoff whereas they are less eager to give Poor player Bs a 1200 token choice. 80% of Rich player As choose SWP for Rich player Bs but only 40% behave with the same preference toward Poor player B ( $(\chi^2(1,n=30)=9), p=0.004$ ). 23.33% of Poor player As on the hand favor player B and even 30% of Poor player As do the same to Rich player B's ( $(\chi^2(1,n=30)=0.5), p=0.72$ ). In both cases, it is clear that in-group favoritism demonstrates itself but the mechanism behind its effect is more subtle and complicated than simply applying a “we are the same” observation. It depends on how these groups are formed and how someone identifies themselves to this group. Being the same group does not automatically infer a warm handshake as a social convention.

<b>Table 8A: Test of in-group favoritism</b> (McNemar test on percentages)			<i>Test statistics</i> ( $\chi^2$ )	<i>p-exact</i>
<i>From player As to player Bs</i>				
Abj to Bbj (71.88%)	vs. (34.38%)	Abj to Bnonbj	9	0.004***
Anbj to Bnbj (44.12%)	vs. (41.18%)	Anbj to Bbj	0.05	0.999
Arich to Brich (80.00%)	vs. (40.00%)	Arich to Bpoor	9	0.004***
Apoor to Bpoor (23.33%)	vs. (30.00%)	Apoor to Brich	0.5	0.72

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Result 2: In-group discrimination exists inside in-group favoritism.*

Player B's action infers reasoning beyond rationality. Would player B be willing to sacrifice her own payoff to retaliate against player A for not choosing an option that gives B more without reducing player A's payoff? Player B faces two choices: one of which yields nothing for either players. Naturally, this is not an efficient outcome and a counter-equilibrium by payoff-maximizing backwards induction. However, there is more than one player that chooses this

option as an attempt to get back at player A (Table 8B). 68.75% of Beijing player Bs go left without punishing player A or pure profit-maximizing for themselves as opposed to the non-Beijing player As (73.53%, ( $\chi^2(1,n=32)=0.11$ ),  $p=0.99$ ).

<b>Table 8B: Test of in-group favoritism</b> (McNemar test on percentages)			<i>Test statistics</i> ( $\chi^2$ )	<i>p-exact</i>
<i>From player Bs to player As</i>				
Bbj to Abj (68.75%)	vs. (73.53%)	Bbj to Anobj	0.11	0.999
Bnbj to Anbj (20.59%)	vs. (68.75%)	Bnbj to Abj	11.84	0.0007***
Brich to Arich (80.00%)	vs. (30.00%)	Brich to Apoor	10.71	0.002***
Bpoor to Apoor (40.00%)	vs. (73.33%)	Bpoor to Arich	7.14	0.01***

Robust standard errors in parentheses

\*\*\*  $p<0.01$ , \*\*  $p<0.05$ , \*  $p<0.1$

The non-Beijing player Bs seem to be more irrational toward the non-Beijing players. Only 20.59% choose to do A the favor of receiving 400 tokens, but 68.75% go with this option, knowing that player A comes from Beijing. ( $\chi^2(1,n=32)=11.84$ ),  $p<0.001$ ).

Rich player Bs also show less envy towards their in-group match. 80% choose to maximize their payoff instead of punishing their Rich partner, whereas only 30% of player Bs treat poor player As with the same favor ( $\chi^2(1,n=30)=10.71$ ),  $p=0.002$ ). This pattern of behavior is observed in the choice of Poor player Bs towards two types of player As (Rich and Poor). Knowing that player A comes from the Rich group surprisingly makes player B less likely to punish player A at their own cost (73.33%). However, in-group members (Poor player As) receive a significantly higher rate of punishment for the initial unfriendly move (only 40%, ( $\chi^2(1,n=30)=7.14$ ),  $p=0.01$ ). This result is the evidence supporting the hypothesis of possible in-group counter discrimination when

the common norms or expectation are not realized. In-group members may be even more mean to each other given a “cold handshake”. Another aspect that can be discussed is that groups that are considered to be relatively disadvantaged will try to sanction bad behavior more often than the advantaged one.

*Result 3: Given these two conditions, which group effect is stronger for the same in-group members:*

<b>Table 9: Comparison of effects</b>		
Wilcoxon rank-sum test	Statistics $z$	$p$ -value
Abj_Bbj vs. Arich_Brich	0.74	0.46
Bbj_Abj vs. Brich_Arich	1.00	0.32
Anonbj_Bnonbj vs. Apoor_Bpoor	-1.77	0.08*
Bnonbj_Anonbj vs. Bpoor_Apoor	1.68	0.09*

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Given that in-group effects exist, it is important to analyze if it matters how these groups are formed. These two groups are actual social group (Beijing and non-Beijing) formed by design and selection and artificial group (Rich and Poor). Being in a Rich or Poor group depends on their individual performance and luck and subjects earn some more payoff to enhance the effect of being “rich” and “poor”. From result 2, it seems that subjects belonging to a relatively advantaged group behave differently compared to the ones in a less advantaged group, Wilcoxon

tests are run to compare the effect among advantaged groups and again among less advantaged groups (Table 9). The test statistics fail to reject a null hypothesis of equal distribution between the advantaged ones to each other. In both cases (player A to player B and player B back to player A), the difference between a Beijing player to another Beijing player is negligible as compared to a Rich player and another Rich player. ( $p=0.46$  and  $p=0.32$ ).

However, the situations differ for the same pairwise comparison of behavior for the less advantaged groups (non-Beijing and Poor). Although the less advantaged groups show significant differences from each other, it is not sufficient to conclude whether socio-economic status or regional variables play a more dominant role in creating a group effect. (The advantaged groups' difference does not demonstrate itself). It is more important to note from this result that when subjects belong to a group of higher status, they exhibit in-group favoritism and out-group discrimination as an attempt to maintain their group status. This leverages data analysis into a deeper and different direction.

*Result 4: When people connect themselves to a group of relatively greater advantage, they are more generous to each other (more in-group favoritism, less envy). When the group they are attached to is less advantaged, members would rather give a handout to another advantaged group(s) than to their in group members.*

To test this hypothesis, a maximum likelihood estimation method is employed to analyze data. Because there are two choices for each player, they are mutually exclusive and hence can be modeled with a logit function:

$$P(\text{action } I) = \frac{e^{\gamma u(\text{action}1)}}{e^{\gamma u(\text{action}1)} + e^{\gamma u(\text{action}2)}}$$

The probability of action 1 for player A is the outcome (400,1200) and it can be calculated due to their mutual exclusiveness. Table 10A and 10B estimate the  $\theta$  preference contingent on the group status of a player.

Regardless of how their group is formed, the more advantaged ones are put together and their preference parameter estimated. Some have argued that in-group effect is more evident in artificial and social groups than natural groups. In this paper, the regional group is more likely to be a natural group and the Rich and Poor group fits the definition of an artificial group. Result 3 does not distinguish the in-group effect between these two as long as they are more advantaged than the other group. Subjects show friendlier behavior to maintain these groups.

Table 10 (panel A and panel B) shows the estimates of preference  $\theta$  between A and B players contingent on their group status. It is clear that when player A belongs to an advantaged group, the preference for a social-welfare choice is positive and significant towards player B.

$\gamma$  is the precision parameter,  $L$  is the log-likelihood function,  $r=1$  if player B's payoff is greater than player A's and  $r=0$  otherwise. Similarly,  $s=1$  if player B's payoff is less than player A's and  $s=0$  otherwise. The parameter  $\rho$  measures B's charity concern when her payoff is higher than her match's, while  $\sigma$  measures B's envy when her payoff is lower than her partner's payoff. (See appendix 8 for details).

<b>Table 10A: Estimates of preference contingent on partner's group status</b>						
<b><i>Panel A: Player A's reaction</i></b>						
Status	B from an advantaged group			B from a disadvantaged group		
	Preference	$z$	$p$ -value	Preference	$z$	$p$ -value

	estimator			estimator		
A from an advantaged group	0.006 (0.001)	3.85	<0.0001***	-0.003 (0.001)	-2.01	<0.05**
A from a disadvantaged group	-0.003 (0.001)	-2.22	<0.03**	-0.003 (0.001)	-2.46	<0.015

**Table 10B: Estimates of preference contingent on partner's group status**

***Panel B: Player A's reaction***

Status	B from an advantaged group			B from a disadvantaged group		
	Preference estimator	<i>z</i>	<i>p</i> -value	Preference estimator	<i>z</i>	<i>p</i> -value
B from an advantaged group	0.002 (0.005)	3.64	<0.0001***	0.002 (0.0004)	0.5	<0.62
B from a disadvantaged group	0.002 (0.005)	3.19	<0.001***	-0.001 (0.0004)	-3.15	<0.002***

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

First, consider panel A with player A's behavior towards player B contingent on their group status. When A belongs to an advantaged group (here are Rich As and Beijing As), they favor player B and the coefficient is positive ( $z=3.85$ ,  $p<0.0001$ ) as long as they know player B is identified by that group. In the case of a disadvantaged group (Poor As and non-Beijing As), they do not have a preference towards a social-welfare choice for player B regardless of player B's status. This includes in-group favoritism. Even though they are in the same boat, it seems that when player A is not happy about this “boat”, they will not be so generous to others in the same situation. Disadvantaged player As also view disadvantaged player Bs as outsiders and exhibit an unfriendly preference.

Panel B estimates preferences of player B against a player's group identity. Player B's behavior is consistent with conjecture 2 where in-group discrimination exists. Even when they share the same identity as being disadvantaged, player Bs have a negative taste for choosing an option in favor of player As ( $p<0.002$ ). However, when they both come from an advantaged group, the opposite is true. Player B's preference for choosing a social-welfare choice in which player As benefit more is positive ( $p<0.0001$ ). Another observation is that, disadvantaged player B's would rather go for a friendly choice towards player A's ( $p<0.001$ ), suggesting that out-group favoritism exists. This is considered to be a signaling behavior as a part of an attempt to be adopted into a more advantaged group.

#### **4. 5 Discussion**

The result of this research sheds light on more detailed and subtle cases of how people identify themselves with more than one group that they belong to and how they interact with other members of these groups. It is common to believe that people tend to favor their in-group



members by default. This may be true for the majority of groups but when taking a closer look at what actually separates those groups, more complex thoughts and consideration arise. It turns out that people do have in-group favoritism but that does not necessarily infer out-group discrimination. On the contrary, in some cases, in-group favoritism turns into in-group discrimination when a mutual norm is violated. This does not happen with out-group members, as the mutual norm is not expected in the first place. It explains phenomena like following a crowd's behavior so as to avoid being seen to break the norm and facing possible future in-group discrimination.

Another important finding of this research shows that when people belong to a group that connects themselves to a relatively better or higher status, they tend to be more generous to members of that given group. This behavior is interpreted as an attempt to maintain and enjoy their status, reassuring their community and to separate themselves from the less advantaged group. However, when people are attached to a group that is inferior to other groups, they will not favor an in-group member as much and would rather exhibit a friendly move towards a higher status group member instead. Even though it is out-group favoritism, this behavior can be explained as a handout and a way of approaching and blending in to a better group. This behavior can be widely used in voting in favor of the less advantaged candidate or the other way around. It can also be an asset in marketing schemes for luxuries and brands. People can make a lot of effort (including financial ones) to be in a group that connects themselves to better images and equates their values to other group members. The division of groups used in this experiment is half natural (geography) and half social (financial status). However, the data do not distinguish significantly between those two group effects. It does not matter how groups are formed, as long as they set a boundary that gives people an idea of hierarchy and advantage as then group effect

comes into play. Some may ask for an explanation of the case where blue and red groups are formed, where the situation is merely categorical. In reality, the case of “red and blue” is not as popular because people associate and compare themselves as a member of society. More important in this reasoning is that, being in a so-called “red” or “blue” group brings no feelings to the people, they will behave purely with in-group favoritism or associate themselves with another given group that is neither “red” or “blue”. Another argument could be, using naïve statistics, people believe they will be regrouped again by nature's choice so they behave under the shadow of future interaction. (Dal Bo 2005). Nonetheless, we can observe the pattern of this group signaling behavior in many social situations. Newly rich people are more willing to spend to be “in the scene”, pave their way with luxury brands and interact more often with other rich people. Even not so rich people do this sometimes if they can afford it. This is a similar behavior to yielding the other a favor in the game, given that the other is a Rich player.

Future work could involve choosing identities from a set of options and letting subjects pick up the one(s) they are willing to reveal in different settings. It will come closer to addressing the question, of which identit(ies) matter(s) when people can show or hide their own. In this experiment, the identity of a subject is based on their performance (social group) or given (geography) hence it frames people to take up the typical behavior of that group. In reality, people have more choices to identify themselves with certain groups and this connection varies according to conditions, thus leaving more space for further studies. This paper contributes to the literature on group identity with findings that can be briefly summarized: it does not only matter that we are in the same boat, it matters more which boat we are both in.

## Chapter 5: General conclusion and contribution

The study challenges the concept of social distance and its development in relation with moral constraints and group distance. Using social distance in experimental economics has reasoned certain pattern of behavior: public good contribution, corruption and interaction between different group members. The empirical findings are evident and specific in each chapter with straight-forward data analysis to answer the following questions:

- a) **How does social distance influence behavior in a public good contribution?** At a high level of social distance, people tend to free-ride public goods and ignore public decorums as long as it increases their personal payoff or comfort. However, when social distance is low, people behave more constructively and contribute more to public goods.
- b) **How do polarized cultures differ at different levels of social distance?** When individual distance is insecure, people's choices have a high variance. The economic assumption of selfishness and payoff maximization holds but not for everyone. German people contribute more to public goods compared Chinese people even when social distance is high. On the contrary, people's behavior does not differ significantly when their identification is realized.
- c) **Does punishment or public information reduce corruption in a developing country?** Punishment works better in reducing corruption while collective information has little impact on the situation.
- d) **How does this change when both tools are used?** In fact, when punishment is lenient, information enhances corrupt behavior as the majority's norm. However, when

punishment constitutes an actual threat, information adds up its effect on punishment and becomes an effective tool against corruption.

- e) **Do people favor their in-group member by default?** People exhibit in-group favoritism and out-group discrimination but not by default. Data show mixed results of in-group favoritism, in-group discrimination, out-group favoritism and out-group discrimination.
- f) **How does group status interfere with in-group favoritism and out-group discrimination?** High status group exhibit strong in-group favoritism to maintain their group status and prevent others to join, which can possibly jeopardize their monopoly. Low status group members, however, show efforts in changing their group identity by out-group favoritism.

The theoretical cases of Croson (2006), Hoffman (1999), Gneezy and Charness (2008) are confirmed. Reducing social distance has a significant impact on people's behavior. It can be firmly asserted that people behavior more constructively under the presence of identification. The expectation of future interaction affects present behavior in a special mechanism, in which people do not necessarily remember an other person's name, face or other personal identities immediately but it has a psychological impact on their security. Any misbehavior is associated with the identity that is revealed and thus, makes a person more likely to correct this misbehavior to improve their own image and protect any possible awkwardness in future interacting. It is what Dal Bo (2005) defines as "the shadow of the future" that casts a spell on present behavior. The higher the probability of future encounter is, the more cooperatively people behave; which can be linked to the revelation of identity (name and face) in this research.

However, the findings of this particular research challenges the result of Croson and Buchan (1999) where they reject the alternative hypothesis of cultural differences in a trust game in favor of a null hypothesis of equal distribution. In fact, under specific circumstances (social distance for instance), different cultures exhibit sharp unequal distribution and patterns of behavior. It provides further arguments and evidence in addition to Yang Liu's (2007) cultural observations. People can associate and attribute culture differences to other social and economic conditions to explain the gap and come up with more ideas for their own research.

Findings from chapter 3 agree with the idea of punishment as a variable with a strong negative correlation to corruption (Cameron, Gangadharan 2009, Klitgaard 1988, Abbink, Irlenbusch and Renner 2002). Punishment, in fact, has proved itself to be the most efficient tool against corruption so far; so it helps to serve as an additional or baseline treatment for other researchers to test other factors affecting corrupt behavior. However it contradicts Brunetti and Weder's (2003) hypothesis from an experimental approach because people are not so sensitive to this factor due to many reasons: social norm, context of information, characteristics of certain countries. It is true that democracy and freedom of public press is inversely related to corruption, but it is not a direct and causal relationship.

Theoretical contribution of chapter 4 is in line partially with Chen and Li (2009), Camerer and Nguyen (2010) and locates itself in the complex interpretation of group effect from Burns (2006), Commins and Lockwood (1979), Duckitt (1998) and Mummendey (1992). Basically in-group favoritism arises when people categorize one another into groups and include themselves in or exclude themselves from at least one of those groups. In the case of pure unbiased groups, group effects influence people's behavior in favor of in-group favoritism. This is the case when people are randomly assigned into groups like class, troops or a given shared space. However,

when groups are divided with some inequality condition(s) (rich / poor, winner / loser, good / bad, high / low), in-group favoritism does not work by default but follows very complex reasoning. Burns (2006) finds out-group favoritism for weak groups as a signal to change their status but in-group discrimination of their own group. This pattern of behavior is again observed in this research only with a slight different of the boundary (respectively rich vs. poor and home vs. guest advantage). So-called high status groups show strong in-group favoritism to protect the group structure to further enjoy their status whereas low status group exhibit out-group favoritism to change their status.

In both cases, future interaction is a good conjecture to reason this behavior. Simply put, it is similar to what changes decisions in chapter 2 where social distance is reduced. People reveal their identities and let the probability of future interacting interfere with their decision making process. When apply on group effect, people with the similar characteristics or social conditions are more likely to meet in the future than the ones without these similarities, hence one theory is that group effects is partly reasoned by future interaction theory (Dal Bo 2005) and the findings in chapter 2.

This book has empirical evidence to show that public behavior can be improved under low levels of social distance, which has useful applications in real life. For instance, mirrors, cameras, posters, real people can play the role of “the public eye” in places where public behavior needs to improve. It is also expected that freedom of speech for the public press in developing countries should not be limited. Information does not seem to have an impact in the experiment, a conjecture for which can be the lack of freedom of speech. Without a free means of public press where different opinions can discuss and attack social problems, people do not react to public information as a source of shared knowledge and trust. NGOs can advocate this in return for the

freedom of bloggers, journalists and other social media writers. The application of the last chapter is the most subtle as it is impossible to navigate the natural process of classification and categorization. However, the unnecessary and unfair in-group favoritism and out-group discrimination can be limited with as little association to the group identity as possible. For instance, in a multinational environment, policies and regulations should not involve any racial, gender factor as well as other group dividing ones (age, marital status, family background to name a few) to lessen any potential unfair treatment.

The scale of this discussion is extensive and potential for a number of future work to better understand the mechanism and the interaction of different factors in relation with social distance and group effect. Future research addressing the following questions can facilitate the attainment of this book:

- Social distance in a field research where face exposure can influence money spent (or tip or an equivalent measurement). The result of which can be used to compare with the findings from chapter 2 to address the experimental effect.
- An experimental game of bargaining in which identities are optional to reveal (religious affiliation, gender, race, age, nationality, face (to be further discussed)). Depending on the position of the people in the game (dictator's game, ultimatum game), which identities are the most willingly revealed?
- A field experiment with language identity to test whether a local language domain or an international language domain makes a foreigner-looking customer more likely to spend more (or less)? This leverages the findings of chapter 4 and takes advantage of out-group interaction through the use of language to analyze the decisions accordingly.

This book has contributed to the literature of social distance, behavioral corruption and group effect through a series of experiments, which encountered a number of limitations that need to be considered. The samples of all the experiments are relatively small, the experimental design of the information treatment faces critics of varied information between different settings as a part of the information is based on the previous stage of the experiment itself. Lastly the division between payoff maximization and forgiveness in the choice of the second player in chapter 4 was not exactly persuasive.

How social distance develops, approaches people at different level and scope and influences people's behavior is the main theme of this book. The results are interesting despite what is usually reported as a unilateral effect of social distance, group identity and the determinants of corruption. Social distance plays an important role in changing public behavior regardless of culture; corruption is not significantly affected by information in a developing country and group effect does not imply in-group favoritism by default. The benefit of social distance in relation with other variables has been shown to be complex, scientifically and dynamically interactive and it deserves future attention for the purpose of research and empirical application.



## Appendix 1: Instruction from the Invisible treatment (Translated)

This is an experiment, the answers to which serve exclusively for the purpose of research and will only be reported collectively. No individual or personal information will be used or for any other purpose.

You will play a game with another person and each of you receives 50 points as an initial endowment. You can choose an amount from 0 to 50 to invest in a common fund, the rest of your endowment will go to your private fund. After you and the other person have made your decision, we will collect your answer and match your answers. The points that you and the other put in the common fund will be multiplied by 1.5 and divided equally between the two of you. Your final payoff will come from two sources: your private fund (the amount that was left from your initial endowment) and your share from the common fund.

Example 1: You decide to invest 50 points in the common fund. The other person decides to invest 50 points in the common fund. Hence the common fund is:  $50+50 = 100$  (points)

Your final payoff = 0 (private fund) + = 75 (points)

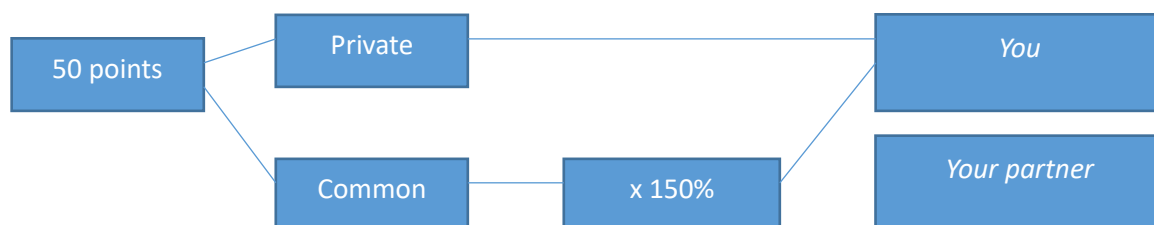
Example 2: You decide to invest 0 point in the common fund. The other person decides to invest 0 point in the common fund. Hence the common fund is:  $0+0=0$  (point)

Your final payoff = 50 (private fund) + = 50 (points)

Example 3: You decide to invest 20 points in the common fund. The other person decides to invest 10 points in the common fund. Hence the common fund is:  $20+10=30$  (points)

Your final payoff = 30 (private fund) + = 52.5 (points)

If you have any other further questions, please raise your hand. Do not discuss with other people.



- 
1. How much do you guess the other person is investing in the common fund?
  2. How much do you decide to invest in the common fund?

Thank you very much.

## **Appendix 2: Instruction from the Name treatment (Translated)**

This is an experiment, the answers to which serve exclusively for the purpose of research and will only be reported collectively. No individual or personal information will be used or for any other purpose.

You will play a game with another person and each of you receives 50 points as an initial endowment. You can choose an amount from 0 to 50 to invest in a common fund, the rest of your endowment will go to your private fund. After you and the other person have made your decision, we will collect your answer and match your answers. The points that you and the other put in the common fund will be multiplied by 1.5 and divided equally between the two of you. Your final payoff will come from two sources: your private fund (the amount that was left from your initial endowment) and your share from the common fund.

Example 1: You decide to invest 50 points in the common fund. The other person decides to invest 50 points in the common fund. Hence the common fund is:  $50+50 = 100$  (points)

Your final payoff = 0 (private fund) + = 75 (points)

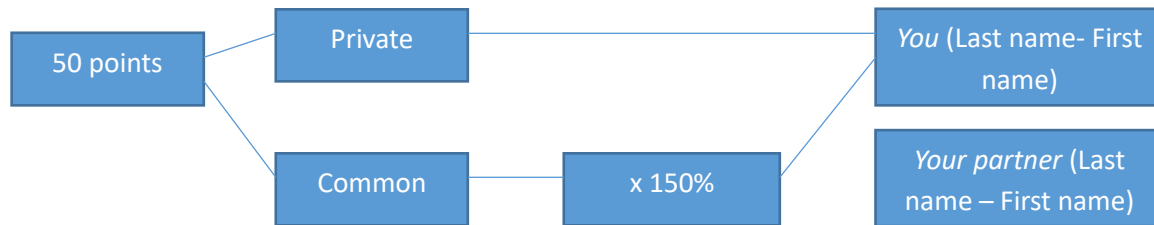
Example 2: You decide to invest 0 point in the common fund. The other person decides to invest 0 point in the common fund. Hence the common fund is:  $0+0=0$  (point)

Your final payoff = 50 (private fund) + = 50 (points)

Example 3: You decide to invest 20 points in the common fund. The other person decides to invest 10 points in the common fund. Hence the common fund is:  $20+10=30$  (points)

Your final payoff = 30 (private fund) + = 52.5 (points)

If you have any other further questions, please raise your hand. Do not discuss with other people.



1. How much do you guess the other person is investing in the common fund?
2. How much do you decide to invest in the common fund?

Thank you very much.

### Appendix 3: Instruction from the Visual treatment (Translated)

This is an experiment, the answers to which serve exclusively for the purpose of research and will only be reported collectively. No individual or personal information will be used or for any other purpose.

You will play a game with another person and each of you receives 50 points as an initial endowment. You can choose an amount from 0 to 50 to invest in a common fund, the rest of your endowment will go to your private fund. After you and the other person have made your decision, we will collect your answer and match your answers. The points that you and the other put in the common fund will be multiplied by 1.5 and divided equally between the two of you. Your final payoff will come from two sources: your private fund (the amount that was left from your initial endowment) and your share from the common fund.

Example 1: You decide to invest 50 points in the common fund. The other person decides to invest 50 points in the common fund. Hence the common fund is:  $50+50 = 100$  (points)

Your final payoff = 0 (private fund) + = 75 (points)

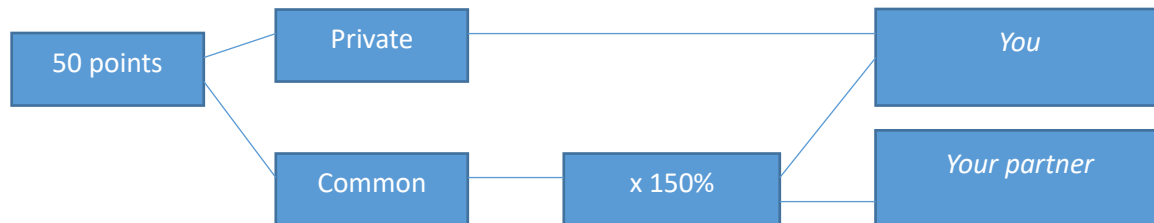
Example 2: You decide to invest 0 point in the common fund. The other person decides to invest 0 point in the common fund. Hence the common fund is:  $0+0=0$  (point)

Your final payoff = 50 (private fund) + = 50 (points)

Example 3: You decide to invest 20 points in the common fund. The other person decides to invest 10 points in the common fund. Hence the common fund is:  $20+10=30$  (points)

Your final payoff = 30 (private fund) + = 52.5 (points)

If you have any other further questions, please raise your hand. Do not discuss with other people.



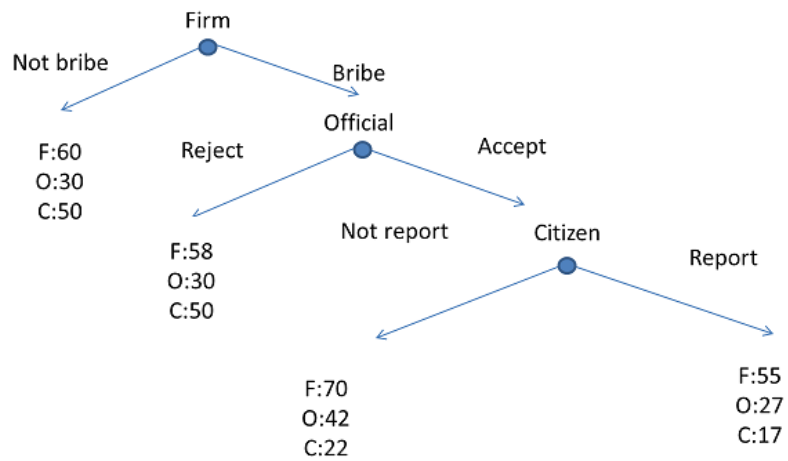
Before answering these questions below, you have 30 seconds to see your partner through a webcam. Please do not try to make any communication with your partner, note that the microphone is muted throughout the experiment.

1. How much do you guess the other person is investing in the common fund?
2. How much do you decide to invest in the common fund?

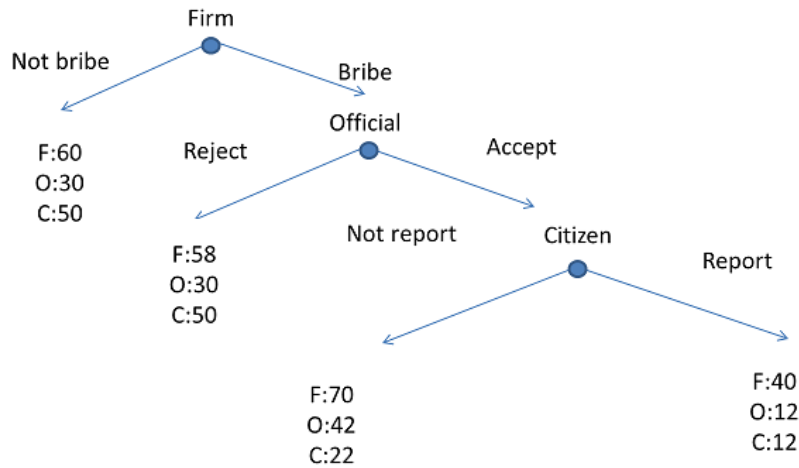
Thank you very much.

#### Appendix 4: Structure of the game (low punishment and high punishment)

### Low punishment treatments



## High punishment treatments



### Appendix 5: Instruction and answer sheet of the Firm under high punishment treatment University of Duisburg-Essen

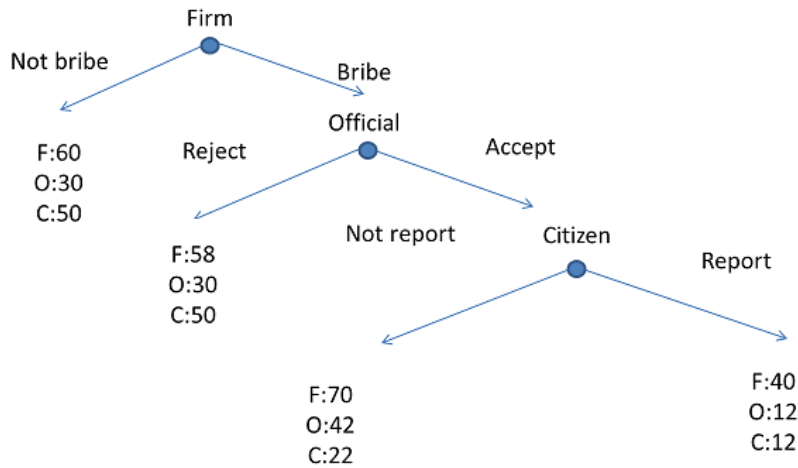
This is an economic experiment from university of Duisburg-Essen. All information will be exclusively reserved for the purpose of doing research, all personal information will not be published. In this experiment, the players will play a scenario in which your decision will determine the outcome of the game, meaning how much payoff you and other players will earn. With each point in the game, you will later on receive 1000 VND (~3.5 cents) apart from your show-up fee.

In this game, you will play the role of the Firm. You have two choices: bribe the Official or not. If you don't bribe, your profit is 60 points, the Official earns 30 points and the Citizen earns 50 points. If you choose to bribe, your profit will depend on the decisions of the Official's and/or the Citizen's as the chart below. If you have any question, please raise your hand. Do not communicate with others.

Circle your choice:

Bribe      Not bribe

## High punishment treatments

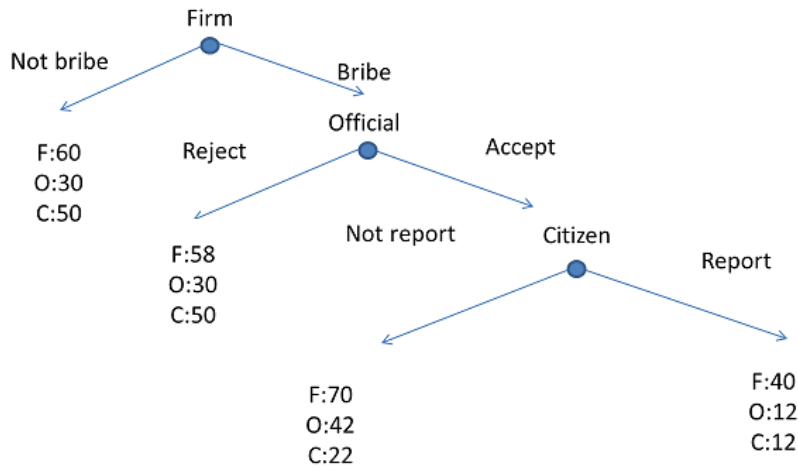


### Appendix 6: Instruction and answer sheet of the Officer under high punishment treatment University of Duisburg-Essen

This is an economic experiment from university of Duisburg-Essen. All information will be exclusively reserved for the purpose of doing research, all personal information will not be published. In this experiment, the players will play a scenario in which your decision will determine the outcome of the game, meaning how much payoff you and other players will earn. With each point in the game, you will later on receive 1000 VND (~3.5 cents) apart from your show-up fee.

In this game, you will play the role of the Officer. You have two choices: accept the bribe from the Firm or not. If you reject the bribe, your profit is 30 points, the Firm earns 58 points and the Citizen earns 50 points. If you choose to accept the bribe, your profit will depend on the decisions of the Citizen's as the chart below. If you have any question, please raise your hand. Do not communicate with others.

## High punishment treatments



Circle your choice:

Reject      Accept

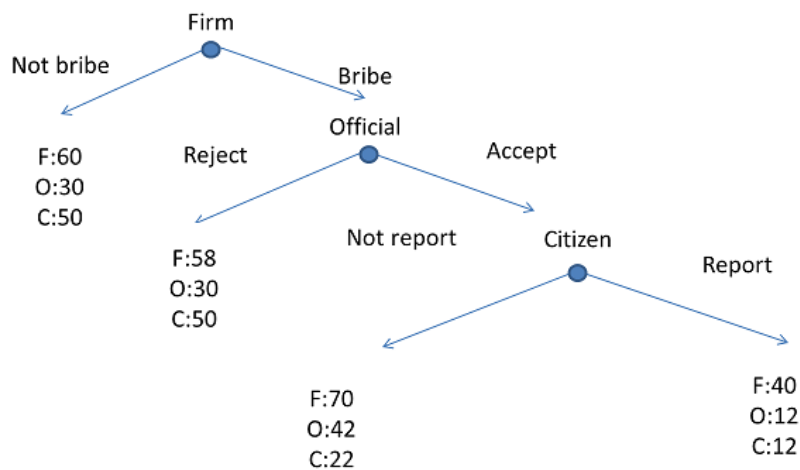
### Appendix 7: Instruction and answer sheet of the Citizen under high punishment treatment University of Duisburg-Essen

This is an economic experiment from university of Duisburg-Essen. All information will be exclusively reserved for the purpose of doing research, all personal information will not be published. In this experiment, the players will play a scenario in which your decision will determine the outcome of the game, meaning how much payoff you and other players will earn. With each point in the game, you will later on receive 1000 VND (~3.5 cents) apart from your show-up fee.

In this game, you will play the role of the Citizen. You have two choices: report the bribe you witness or not. If you do not report it, your profit is 22 points, the Firm earns 70 points and the Officer earns 42 points. If you choose to report the bribe, your profit will be 12, the Firm earns 40 and the Officer earns 12. If you have any question, please raise your hand. Do not communicate with others.



## High punishment treatments



Circle your choice:

Report      Not report

## Appendix 8: Formulate MLE

$$P(\text{action 1}) = \frac{e^{\gamma u(\text{action1})}}{e^{\gamma u(\text{action1})} + e^{\gamma u(\text{action2})}} = \frac{e^{\gamma[u(\text{action1}) - u(\text{action2})]}}{e^{\gamma[u(\text{action1}) - u(\text{action2})]} + 1}$$

The exponent becomes:

$$U_A(\pi_A, \pi_B) = (\rho r + \sigma s) \pi_B + (1 - \rho r + \sigma s) \pi_A$$

$$U_B(\pi_A, \pi_B) = (\rho r + \sigma s) \pi_A + (1 - \rho r + \sigma s) \pi_B$$

For player A, the exponent of  $e$  is equal to:

$$\begin{aligned} & \gamma \{ (\rho r_1 + \sigma s_1) \pi_B^1 + [1 - (\rho r_1 + \sigma s_1) \pi_A^1] - [(\rho r_2 + \sigma s_2) \pi_B^2 + (1 - \rho r_2 - \sigma s_2) \pi_A^2] \} \\ & = \gamma \rho (r_1 \pi_B^1 - r_1 \pi_A^1 - r_2 \pi_B^2 - r_2 \pi_A^2) + \gamma \sigma (s_1 \pi_B^1 - s_1 \pi_A^1 - s_2 \pi_B^2 - s_2 \pi_A^2) + \gamma (\pi_A^1 - \pi_A^2) \end{aligned}$$

Let  $\theta_1 = \gamma \rho x_1 + \gamma \sigma x_2 + \gamma (\pi_A^1 - \pi_A^2)$  where

$$x_1 = r_1 \pi_B^1 - r_1 \pi_A^1 - r_2 \pi_B^2 - r_2 \pi_A^2$$

$$x_2 = s_1 \pi_B^1 - s_1 \pi_A^1 - s_2 \pi_B^2 - s_2 \pi_A^2$$

For player B, the exponent of  $e$  is equal to:

$$\begin{aligned} & \gamma \{ (\rho r_1 + \sigma s_1) \pi_A^{B1} + [1 - (\rho r_1 + \sigma s_1) \pi_B^{B1}] - [(\rho r_2 + \sigma s_2) \pi_A^{B2} + (1 - \rho r_2 - \sigma s_2) \pi_B^{B2}] \} \\ & = \gamma \rho (r_1 \pi_A^{B1} + r_1 \pi_B^{B1} - r_2 \pi_A^{B2} + r_2 \pi_B^{B2}) + \gamma \sigma (s_1 \pi_A^{B1} + s_1 \pi_B^{B1} - s_2 \pi_A^{B2} + s_2 \pi_B^{B2}) - \gamma (\pi_B^{B2} + \pi_B^{B1}) \end{aligned}$$

Let  $\theta_2 = \gamma \rho x'_1 + \gamma \sigma x'_2 - \gamma (\pi_B^{B2} + \pi_B^{B1})$  where

$$x'_1 = r_1 \pi_A^{B1} + r_1 \pi_B^{B1} - r_2 \pi_A^{B2} + r_2 \pi_B^{B2}$$

$$x'_2 = s_1 \pi_A^{B1} + s_1 \pi_B^{B1} - s_2 \pi_A^{B2} + s_2 \pi_B^{B2}$$

The log likelihood function is therefore:

$$\ln L = \{ y_i \ln \left( \frac{e^{\theta}}{e^{\theta} + 1} \right) + (1 - y_i) \ln \left( 1 - \frac{e^{\theta}}{e^{\theta} + 1} \right) \}$$

## **Appendix 9:**

Translation of instruction:

Thank you for taking part in the experiment. You will receive 30 RMB as a show-up fee and additional earnings from the experiment depending on the outcomes of the games. You will play 2 games and your decisions in these two games are independent of each other. For instance, if you earn 20 RMB in the first game and 50 RMB in the second game, your total earnings after the experiment will be: 30 RMB (show-up fee) + 20 RMB (first game) + 50 RMB (second game) = 100 RMB

In each game, you will be paired with another player and the outcome of the game will depend on both of your decisions. You will be matched with different people each time so you will not play against another for more than one time.

In each game, players will be denoted as player A and player B to secure your anonymity. If there is more than one stage in the game, it will happen step by step and start with player A. After player A makes a decision, player B will have their turn. When you have made your decision, please turn your answer sheet upside down and wait for others.

There are 2 games in which you will play with different roles. After the first game is played, we will notify the results and move on into the next game. Please raise your hand if you have any questions.

#### Game 1:

In this game, you will make 3 spontaneous and independent choices like the paper-scissors-stone game. With each choice, you have three options: paper, scissors or stone. If you are free to make these choices however you like. The rule is: paper covers stone, stone breaks scissors and scissors cuts paper. This constitutes a win. Two papers yield a draw.

After you make your decisions, we will collect your answer sheet and match it with another random player. Two or more wins will decide the winner of this game. In the case of 3 draws, the experimenter will arbitrarily decide a winner.

The winner receives 20 tokens. The others do not receive anything.

(the exchange rate is 1 token = 1 RMB)

Circle your choices:



### Game 2A:

In this game, you are player A. You make the first move and have the choice of A1 and A2.

If you choose A1, you will receive 400 tokens and player B will receive 1200 tokens. The game ends there without any further move of player B.

If you choose A2, player B will make their move. They will either choose B1 or B2. If they choose B1, you will receive 400 tokens and they will receive 200 tokens. If they choose B2, both of you receive 0 token. Player B knows that their choice decide the outcomes of the game and can observe your decision.

In this game, the player B you are playing against come from the (Beijing / non-Beijing) group.

(Rich / Poor)

(the exchange rate in this game: 10 tokens = 1 RMB)

Please circle your choice: A1      A2

Thank you!

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Game 2B:

In this game, you are player B and have the choice of B1 and B2. Player A has made their decision. If player A had chosen A1, you would have received 1200 tokens and they receive 400 tokens. If player A had chosen A2, you would be able to make your decision now.

If you choose B1, you will receive 200 tokens and player A will receive 400 tokens.

If you choose B2, both of you will receive 0 tokens.

In this game, the player A you are playing against comes from the (Beijing / non-Beijing) group.

(Rich / Poor)

(the exchange rate in this game: 10 tokens = 1 RMB)

Please circle your choice: B1      B2

Thank you!

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